Date: 21 January 2000
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200 Area Source Characterization - 200-CW-1 Operable Unit
Subject: Volatiles - Data Package No. H0534-RLN (SDG No. H0534)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0534-RLN prepared by Recra LabNet (RLN). A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B0WBR0	9/14/99	Soil	C	See note 1 & 2
B0WBR1	9/14/99	Soil	C	See note 1 & 2
B0WBR2	9/14/99	Soil	C	See note 1 & 2
B0WBR4	9/14/99	Soil	C	See note 1 & 2
B0WBR5	9/15/99	Soil	C	See note 1 & 2
B0WBR6	9/15/99	Soil	C	See note 1 & 2
B0WBR7	9/15/99	Soil	C	See note 1 & 2
B0WBR8	9/15/99	Soil	C	See note 1 & 2

1 - Volatiles by EPA 8260A
2 - Alcohols (butanol and ethanol) by 8015B and diesel range organics by 8015B

Data validation was conducted in accordance with the BHI validation statement of work and the *200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan*, DOE/RL-99-07, Draft B. Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

- **Holding Times**

Analytical holding times are assessed to ascertain whether the holding time requirements were met by the laboratory. Preserved water samples must be analyzed within 14 days of the date of sample collection for VOA, diesel and alcohols. If holding times are exceeded, but not by greater than twice the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than twice the limit, all associated detected sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were met.

- **Blanks**

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples of a given matrix. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for laboratory contaminants) the highest associated blank result, the sample result value is raised to the CRQL, qualified as undetected and flagged "U".

Due to laboratory blank contamination, the methylene chloride results in all samples were qualified as undetected and flagged "U" .

Due to laboratory blank contamination, the acetone result in samples B0WBR5, B0WBR6, B0WBR7 and B0WBR8 were raised to the CRDL, qualified as undetected and flagged "U".

Due to laboratory blank contamination, the 2-butanone result in samples B0WBR5, B0WBR7 and B0WBR8 were raised to the CRDL, qualified as undetected and flagged "U".

All other method blank results were acceptable.

- **Accuracy**

Matrix Spike/Matrix Spike Duplicate Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using the target compounds for which percent recoveries must be within 70-130%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to a matrix spike recovery of 47%, the n-propyl alcohol and ethanol results in samples B0WBR0, B0WBR1, B0WBR2 and B0WBR4 were qualified as estimates and flagged "J".

Due to the lack of a matrix spike/matrix spike duplicate analysis, all volatile organic results in samples B0WBR0, B0WBR1, B0WBR2 and B0WBR4 were qualified as estimates and flagged "J".

All other matrix spike/matrix spike duplicate recovery results were acceptable.

Surrogate Recovery

The analysis of surrogate compounds provides a measure of system performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory program. When a surrogate compound recovery is out of the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Undetected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Samples with surrogate recoveries less than ten percent are qualified as estimates and flagged "J" for detects, and rejected and flagged "UR" for nondetects. Undetected compounds with surrogate recoveries greater than the upper control limit require no qualification. Surrogates are not required for formaldehyde analysis.

Due to the lack of a surrogate analysis, all n-propyl alcohol and ethanol results were qualified as estimates and flagged "J".

All other surrogate recovery results were acceptable.

- **Precision**

  Matrix Spike/Matrix Spike Duplicate Samples

  Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. For samples analyzed using SW-846 protocol, results must be within RPD limits of +/- 30% for solid samples. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

  All precision results were acceptable.

  Field Duplicate Samples

  One pair of field duplicate samples (samples B0WBR6/B0WBR7) were submitted to RLN for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the CRDL (if available) to ensure that laboratory detection levels meet the required criteria. The results for chloromethane bormomethane, vinyl chloride, chloroethane, 4-methyl-2-pentanone, acetone and 2-hexanone were reported above the CRDL in all undetected samples; and all undetected analytes in samples B0WBR0, B0WBR1, B0WBR6 and B0WBR8. Under the BHI validation SOW, no qualification is required. All other reported detection limits met their CRDL.

- **Completeness**

Data package No. H0534-RLN (SDG No. H0534) was submitted for validation and verified for completeness. The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to a matrix spike recovery of 47%, the n-propyl alcohol and ethanol results in samples B0WBR0, B0WBR1, B0WBR2 and B0WBR4 were qualified as estimates and flagged "J". Due to the lack of a surrogate analysis, all n-propyl alcohol and ethanol results were qualified as estimates and flagged "J". Due to the lack of a matrix spike/matrix spike duplicate analysis, all volatile organic results in samples B0WBR0, B0WBR1, B0WBR2 and B0WBR4 were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

Due to laboratory blank contamination, the methylene chloride results in all samples were qualified as undetected and flagged "U". Due to laboratory blank contamination, the acetone result in samples B0WBR5, B0WBR6, B0WBR7 and B0WBR8 were raised to the CRDL, qualified as undetected and flagged "U". Due to laboratory blank contamination, the 2-butanone result in samples B0WBR5, B0WBR7 and B0WBR8 were raised to the CRDL, qualified as undetected and flagged "U".

The results for chloromethane bormomethane, vinyl chloride, chloroethane, 4-methyl-2-pentanone, acetone and 2-hexanone were reported above the CRDL in all undetected samples; and all undetected analytes in samples B0WBR0, B0WBR1, B0WBR6 and B0WBR8. Under the BHI validation SOW, no qualification is required.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-99-07, Draft B, *200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan.*

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validator in compliance with the BHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, but the data are usable for decision-making purposes.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H0534	REVIEWER: TLI	DATE: 1/21/00	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Volatile orgainics	J	B0WBR0, B0WBR1, B0WBR2, B0WBR4	No matrix spike analysis
n-Propyl alcohol, ethanol	J	B0WBR0, B0WBR1, B0WBR2, B0WBR4	MS percent recovery
Methylene chloride	U	All	Blank contamination
Acetone	U	B0WBR5, BOWBR6, B0WBR7, B0WBR8	Blank contamination
2-Butanone	U	B0WBR5, BOWBR7, BOWBR8	Blank contamination
n-Propyl alcohol, ethanol	J	All	No surrogate analysis

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

VOLATILE ORGANIC, ALCOHOL AND DIESEL ANALYSIS, SOIL MATRIX, (UG/KG)

Project: BECHTEL-HANFORD																	
Laboratory: RECRA LabNet																	
Case:	SDG: H0534																
Sample Number		B0WBR0		B0WBR1		B0WBR2		B0WBR4		B0WBR5		B0WBR6		B0WBR7		B0WBR8	
Location		B8758		B8758		B8758		B8758		B8758		B8758		B8758		B8758	
Remarks														Duplicate			
Sample Date		09/14/99		09/14/99		09/14/99		09/14/99		09/15/99		09/15/99		09/15/99		09/15/99	
Analysis Date		09/23/99		09/23/99		09/23/99		09/23/99		09/28/99		09/28/99		09/28/99		09/29/99	
VOA/Alcohols/Diesel	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chloromethane	5	11	UJ	11	UJ	10	UJ	10	UJ	10	U	11	U	10	U	11	U
Bromomethane	5	11	UJ	11	UJ	10	UJ	10	UJ	10	U	11	U	10	U	11	U
Vinyl Chloride	5	11	UJ	11	UJ	10	UJ	10	UJ	10	U	11	U	10	U	11	U
Chloroethane	5	11	UJ	11	UJ	10	UJ	10	UJ	10	U	11	U	10	U	11	U
Methylene Chloride	5	12	UJ	10	UJ	7	UJ	9	UJ	12	U	15	U	15	U	12	U
Acetone	10	11	UJ	11	UJ	10	UJ	10	UJ	10	U	10	U	10	U	10	U
Carbon Disulfide		6	UJ	6	UJ	5	UJ	5	UJ	5	U	6	U	5	U	6	U
1,1-Dichloroethene	5	6	UJ	6	UJ	5	UJ	5	UJ	5	U	6	U	5	U	6	U
1,1-Dichloroethane	5	6	UJ	6	UJ	5	UJ	5	UJ	5	U	6	U	5	U	6	U
1,2-Dichloroethene (total)	5	6	UJ	6	UJ	5	UJ	5	UJ	5	U	6	U	5	U	6	U
Chloroform	5	6	UJ	6	UJ	5	UJ	5	UJ	5	U	6	U	5	U	6	U
1,2-Dichloroethane	5	6	UJ	6	UJ	5	UJ	5	UJ	5	U	6	U	5	U	6	U
2-Butanone	10	6	J	6	J	4	J	5	J	10	U	11	U	10	U	10	U
1,1,1-Trichloroethane	5	6	UJ	6	UJ	5	UJ	5	UJ	5	U	6	U	5	U	6	U
Carbon Tetrachloride	5	6	UJ	6	UJ	5	UJ	5	UJ	5	U	6	U	5	U	6	U
Bromodichloromethane	5	6	UJ	6	UJ	5	UJ	5	UJ	5	U	6	U	5	U	6	U
1,2-Dichloropropane	5	6	UJ	6	UJ	5	UJ	5	UJ	5	U	6	U	5	U	6	U
cis-1,3-Dichloropropene	5	6	UJ	6	UJ	5	UJ	5	UJ	5	U	6	U	5	U	6	U
Trichloroethene	5	6	UJ	6	UJ	5	UJ	5	UJ	5	U	6	U	5	U	6	U
Dibromochloromethane	5	6	UJ	6	UJ	5	UJ	5	UJ	5	U	6	U	5	U	6	U
1,1,2-Trichloroethane	5	6	UJ	6	UJ	5	UJ	5	UJ	5	U	6	U	5	U	6	U
Benzene	5	2	J	6	UJ	5	UJ	5	UJ	5	U	6	U	5	U	6	U
trans-1,3-Dichloropropene	5	6	UJ	6	UJ	5	UJ	5	UJ	5	U	6	U	5	U	6	U
Bromoform	5	6	UJ	6	UJ	5	UJ	5	UJ	5	U	6	U	5	U	6	U
4-Methyl-2-pentanone	5	11	UJ	11	UJ	10	UJ	10	UJ	10	U	11	U	10	U	11	U
2-Hexanone	5	11	UJ	11	UJ	10	UJ	10	UJ	10	U	11	U	10	U	11	U
Tetrachloroethene	5	6	UJ	6	UJ	5	UJ	5	UJ	5	U	6	U	5	U	6	U
1,1,2,2-Tetrachloroethane	5	6	UJ	6	UJ	5	UJ	5	UJ	5	U	6	U	5	U	6	U
Toluene	5	1	J	6	UJ	5	UJ	5	UJ	5	U	6	U	5	U	6	U
Chlorobenzene	5	6	UJ	6	UJ	5	UJ	5	UJ	5	U	6	U	5	U	6	U
Ethylbenzene	5	6	UJ	6	UJ	5	UJ	5	UJ	5	U	6	U	5	U	6	U
Styrene		6	UJ	6	UJ	5	UJ	5	UJ	5	U	6	U	5	U	6	U
Xylenes (total)	5	6	UJ	6	UJ	5	UJ	5	UJ	5	U	6	U	5	U	6	U
n-Propyl Alcohol		5.5	UJ	5.0	UJ	4.4	UJ	4.4	UJ	4.9	UJ	5.0	UJ	4.6	UJ	5.0	U
Ethanol		5.5	UJ	5.0	UJ	4.4	UJ	4.4	UJ	4.9	UJ	5.0	UJ	4.6	UJ	5.0	U
Diesel Range Organics	5	4.3	U	4.2	U	4.1	U	4.1	U	4.0	U	4.2	U	4.2	U	4.4	U

	Cust ID:	B0WBR0	B0WBR1	B0WBR2	B0WBR4	VBLKSQ
Sample Information	RFW#:	001	002	003	004	99LVH366-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	0.962	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate Recovery	Toluene-d8	98 %	109 %	98 %	98 %	98 %
	Bromofluorobenzene	89 %	101 %	91 %	88 %	92 %
	1,2-Dichloroethane-d4	104 %	115 %	100 %	99 %	103 %
Chloromethane		11 U J	11 U J	10 U J	10 U J	10 U
Bromomethane		11 U	11 U	10 U	10 U	10 U
Vinyl Chloride		11 U	11 U	10 U	10 U	10 U
Chloroethane		11 U	11 U	10 U	10 U	10 U
Methylene Chloride		12 BU	10 BU	7 BU	9 BU	3 J
Acetone		11 U	11 U	10 U	10 U	10 U
Carbon Disulfide		6 U	6 U	5 U	5 U	5 U
1,1-Dichloroethene		6 U	6 U	5 U	5 U	5 U
1,1-Dichloroethane		6 U	6 U	5 U	5 U	5 U
1,2-Dichloroethene (total)		6 U	6 U	5 U	5 U	5 U
Chloroform		6 U	6 U	5 U	5 U	5 U
1,2-Dichloroethane		6 U	6 U	5 U	5 U	5 U
2-Butanone		6 *	6 *	4 J	5 *	10 U
1,1,1-Trichloroethane		6 U	6 U	5 U	5 U	5 U
Carbon Tetrachloride		6 U	6 U	5 U	5 U	5 U
Bromodichloromethane		6 U	6 U	5 U	5 U	5 U
1,2-Dichloropropane		6 U	6 U	5 U	5 U	5 U
cis-1,3-Dichloropropene		6 U	6 U	5 U	5 U	5 U
Trichloroethene		6 U	6 U	5 U	5 U	5 U
Dibromochloromethane		6 U	6 U	5 U	5 U	5 U
1,1,2-Trichloroethane		6 U	6 U	5 U	5 U	5 U
Benzene		2 *	6 U	5 U	5 U	5 U
Trans-1,3-Dichloropropene		6 U	6 U	5 U	5 U	5 U
Bromoform		6 U	6 U	5 U	5 U	5 U
4-Methyl-2-pentanone		11 U	11 U	10 U	10 U	10 U
2-Hexanone		11 U	11 U	10 U	10 U	3 J
Tetrachloroethene		6 U	6 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane		6 U	6 U	5 U	5 U	5 U
Toluene		1 *	6 U	5 U	5 U	5 U

*= Outside of EPA CLP QC limits.

000012

RFW Batch Number: 9909L129 Client: TNU-HANFORD B99-078 Work Order: 10985001001 Page: 1b

Cust ID:	B0WBR0	B0WBR1	B0WBR2	B0WBR4	VBLKSQ
RFW#:	001	002	003	004	99LVH366-MB1
Chlorobenzene	6 U J	6 U J	5 U J	5 U J	5 U
Ethylbenzene	6 U ↓	6 U ↓	5 U ↓	5 U ↓	5 U
Styrene	6 U ↓	6 U ↓	5 U ↓	5 U ↓	5 U
Xylene (total)	6 U ↓	6 U ↓	5 U	5 U ↓	5 U

*= Outside of EPA CLP QC limits.

2/14/00

Recra LabNet - Lionville Laboratory
Volatiles by GC/MS, HSL List
Report Date: 10/22/99 16:31

RFW Batch Number: 9909L127 Client: TNU-HANFORD B99-078 Work Order: 10985001001 Page: 1a

	Cust ID:	B0WBR8	B0WBR5	B0WBR6	B0WBR7	B0WBR7	B0WBR7
Sample Information	RFW#:	001	002	003	004	004 MS	004 MSD
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.02	0.980	1.00	0.980	0.980	0.980
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate Recovery	Toluene-d8	109 %	108 %	109 %	108 %	106 %	106 %
	Bromofluorobenzene	96 %	99 %	95 %	97 %	95 %	95 %
	1,2-Dichloroethane-d4	118 %	118 %	115 %	118 %	120 %	117 %
Chloromethane		11 U	10 U	11 U	10 U	10 U	10 U
Bromomethane		11 U	10 U	11 U	10 U	10 U	10 U
Vinyl Chloride		11 U	10 U	11 U	10 U	10 U	10 U
Chloroethane		11 U	10 U	11 U	10 U	10 U	10 U
Methylene Chloride		12 ~~B~~U	12 ~~B~~U	15 ~~B~~U	15 ~~B~~U	14 B	10 B
Acetone		~~10~~A ~~J~~B	16 A ~~J~~B	~~10~~A ~~J~~BJ	~~10~~A ~~J~~B	4 JB	4 BJ
Carbon Disulfide		6 U	5 U	6 U	5 U	5 U	5 U
1,1-Dichloroethene		6 U	5 U	6 U	5 U	93 %	96 %
1,1-Dichloroethane		6 U	5 U	6 U	5 U	5 U	5 U
1,2-Dichloroethene (total)		6 U	5 U	6 U	5 U	5 U	5 U
Chloroform		6 U	5 U	6 U	5 U	5 U	5 U
1,2-Dichloroethane		6 U	5 U	6 U	5 U	5 U	5 U
2-Butanone		~~10~~J ~~J~~B	~~10~~J ~~J~~B	11 U	~~10~~J ~~J~~B	10 U	10 U
1,1,1-Trichloroethane		6 U	5 U	6 U	5 U	5 U	5 U
Carbon Tetrachloride		6 U	5 U	6 U	5 U	5 U	5 U
Bromodichloromethane		6 U	5 U	6 U	5 U	5 U	5 U
1,2-Dichloropropane		6 U	5 U	6 U	5 U	5 U	5 U
cis-1,3-Dichloropropene		6 U	5 U	6 U	5 U	5 U	5 U
Trichloroethene		6 U	5 U	6 U	5 U	106 %	108 %
Dibromochloromethane		6 U	5 U	6 U	5 U	5 U	5 U
1,1,2-Trichloroethane		6 U	5 U	6 U	5 U	5 U	5 U
Benzene		6 U	5 U	6 U	5 U	114 %	115 %
Trans-1,3-Dichloropropene		6 U	5 U	6 U	5 U	5 U	5 U
Bromoform		6 U	5 U	6 U	5 U	5 U	5 U
4-Methyl-2-pentanone		11 U	10 U	11 U	10 U	10 U	10 U
2-Hexanone		11 U	10 U	11 U	10 U	10 U	10 U
Tetrachloroethene		6 U	5 U	6 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane		6 U	5 U	6 U	5 U	5 U	5 U
Toluene		6 U	5 U	6 U	5 U	117 %	117 %

*= Outside of EPA CLP QC limits.

RFW Batch Number: 9909L127 Client: TNU-HANFORD B99-078 Work Order: 10985001001 Page: 1b

Cust ID:	B0WBR8	B0WBR5	B0WBR6	B0WBR7	B0WBR7	B0WBR7
RFW#:	001	002	003	004	004 MS	004 MSD
Chlorobenzene	6 U	5 U	6 U	5 U	106 %	107 %
Ethylbenzene	6 U	5 U	6 U	5 U	5 U	5 U
Styrene	6 U	5 U	6 U	5 U	5 U	5 U
Xylene (total)	6 U	5 U	6 U	5 U	5 U	5 U

*= Outside of EPA CLP QC limits.

2/14/00

000015

		Cust ID:	VBLKTP		VBLKTP BS		VBLKTO	
Sample Information		RFW#:	99LVN318-MB1		99LVN318-MB1		99LVN316-MB1	
		Matrix:	SOIL		SOIL		SOIL	
		D.F.:	1.00		1.00		1.00	
		Units:	UG/KG		UG/KG		UG/KG	
Surrogate Recovery	Toluene-d8		104	%	102	%	106	%
	Bromofluorobenzene		97	%	96	%	99	%
	1,2-Dichloroethane-d4		112	%	118	%	112	%
Chloromethane			10	U	10	U	10	U
Bromomethane			10	U	10	U	10	U
Vinyl Chloride			10	U	10	U	10	U
Chloroethane			10	U	10	U	10	U
Methylene Chloride			6		2	JB	3	J
Acetone			2	J	1	JB	4	J
Carbon Disulfide			5	U	5	U	5	U
1,1-Dichloroethene			5	U	93	%	5	U
1,1-Dichloroethane			5	U	5	U	5	U
1,2-Dichloroethene (total)			5	U	5	U	5	U
Chloroform			5	U	5	U	5	U
1,2-Dichloroethane			5	U	5	U	5	U
2-Butanone			2	J	10	U	1	J
1,1,1-Trichloroethane			5	U	5	U	5	U
Carbon Tetrachloride			5	U	5	U	5	U
Bromodichloromethane			5	U	5	U	5	U
1,2-Dichloropropane			5	U	5	U	5	U
cis-1,3-Dichloropropene			5	U	5	U	5	U
Trichloroethene			5	U	104	%	5	U
Dibromochloromethane			5	U	5	U	5	U
1,1,2-Trichloroethane			5	U	5	U	5	U
Benzene			5	U	112	%	5	U
Trans-1,3-Dichloropropene			5	U	5	U	5	U
Bromoform			5	U	5	U	5	U
4-Methyl-2-pentanone			10	U	10	U	10	U
2-Hexanone			10	U	10	U	10	U
Tetrachloroethene			5	U	5	U	5	U
1,1,2,2-Tetrachloroethane			5	U	5	U	5	U
Toluene			5	U	110	%	5	U

*= Outside of EPA CLP QC limits.

000516

10/22/99

1/4/00

	Cust ID: VBLKTP	VBLKTP BS	VBLKTO
	RFW#: 99LVN318-MB1	99LVN318-MB1	99LVN316-MB1
Chlorobenzene	5 U	104 %	5 U
Ethylbenzene	5 U	5 U	5 U
Styrene	5 U	5 U	5 U
Xylene (total)	5 U	5 U	5 U

*= Outside of EPA CLP QC limits.

1/11/00

003

	Cust ID:	B0WBR0	B0WBR0	B0WBR0	B0WBR1	B0WBR2	B0WBR4
Sample Information	RFW#:	001	001 MS	001 MSD	002	003	004
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
n-Propyl Alcohol		5.5 U J	47 * %	53 %	5.0 U J	4.4 U J	4.4 U J
Ethanol		5.5 U J	5.5 U	5.0 U	5.0 U J	4.4 U J	4.4 U J

	Cust ID:	BLK	BLK BS
Sample Information	RFW#:	99LLC143-MB1	99LLC143-MB1
	Matrix:	SOIL	SOIL
	D.F.:	1.00	1.00
	Units:	mg/kg	mg/kg
n-Propyl Alcohol		5.0 U	89 %
Ethanol		5.0 U	5.0 U

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of Advisory limits.

000018

10/4/99

1/11/00

003

	Cust ID:	B0WBR8	B0WBR8	B0WBR8	B0WBR5	B0WBR6	B0WBR7
Sample Information	RFW#:	001	001 MS	001 MSD	002	003	004
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
n-Propyl Alcohol		5.0 U J	115 %	110 %	4.9 U J	5.0 U J	4.6 U J
Ethanol		5.0 U J	5.5 U	5.0 U	4.9 U J	5.0 U J	4.6 U J

	Cust ID:	BLK	BLK BS
Sample Information	RFW#:	99LLC143-MB1	99LLC143-MB1
	Matrix:	SOIL	SOIL
	D.F.:	1.00	1.00
	Units:	mg/kg	mg/kg
n-Propyl Alcohol		5.0 U	89 %
Ethanol		5.0 U	5.0 U

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of Advisory limits.

000019

10/4/99 pk

1/11/00

Recra LabNet - Lionville Laboratory

DIESEL RANGE ORGANICS BY GC

Report Date: 10/14/99 09:35

RFW Batch Number: 9909L127 Client: TNU-HANFORD B99-078 Work Order: 10985-001-001-9999-00 Page: 1

003

	Cust ID:	B0WBR8	B0WBR8	B0WBR8	B0WBR5	B0WBR6	B0WBR7
Sample Information	RFW#:	001	001 MS	001 MSD	002	003	004
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Surrogate:	p-Terphenyl	119 %	109 %	97 %	101 %	78 %	83 %
Diesel Range Organics		4.4 U	108 %	91 %	4.0 U	4.2 U	4.2 U

	Cust ID:	BLK	BLK BS
Sample Information	RFW#:	99LE1153-MB1	99LE1153-MB1
	Matrix:	SOIL	SOIL
	D.F.:	1.00	1.00
	Units:	mg/kg	mg/kg
Surrogate:	p-Terphenyl	97 %	94 %
Diesel Range Organics		4.0 U	93 %

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of Advisory limits.

000020

1/14/00

Recra LabNet - Lionville Laboratory

DIESEL RANGE ORGANICS BY GC

Report Date: 10/12/99 13:16

RFW Batch Number: 9909L129 Client: TNU-HANFORD B99-078 Work Order: 10985-001-001-9999-00 Page: 1

003

	Cust ID:	B0WBR0	B0WBR0	B0WBR0	B0WBR1	B0WBR2	B0WBR4
Sample Information	RFW#:	001	001 MS	001 MSD	002	003	004
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Surrogate:	p-Terphenyl	104 %	115 %	99 %	95 %	104 %	100 %
Diesel Range Organics		4.3 U	79 %	75 %	4.2 U	4.1 U	4.1 U

	Cust ID:	BLK	BLK BS
Sample Information	RFW#:	99LE1153-MB1	99LE1153-MB1
	Matrix:	SOIL	SOIL
	D.F.:	1.00	1.00
	Units:	mg/kg	mg/kg
Surrogate:	p-Terphenyl	97 %	94 %
Diesel Range Organics		4.0 U	93. %

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of Advisory limits.

000021

10/12/99

1/11/00

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client: TNU-HANFORD B99-078
RFW #: 9909L129
SDG/SAF #: H0534/B99-078

W.O. #: 10985-001-001-9999-00
Date Received: 09-17-99

GC/MS VOLATILE

Four (4) soil samples were collected on 09-14-99.

The samples and their associated QC samples were analyzed according to criteria set forth in Recra OPs based on SW 846 Method 8260A for TCL Volatile target compounds on 09-23-99.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. The cooler temperature upon receipt has been recorded on the chain-of-custody.

2. The required holding time for analysis was met.

3. Non-target compounds were not detected in the samples.

4. All surrogate recoveries were within EPA QC limits.

5. Matrix spike analyses for SDG H0534 were performed on RFW# 9909L127, sample ID-B0WBR7.

6. The method blank contained the common laboratory contaminant Methylene Chloride and the target compound 2-Butanone at levels less than the CRQL.

By: J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

01-18-00
Date

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01

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client : TNU-HANFORD B99-078
RFW# : 9909L127
SDG/SAF #: H0534/B99-078

W.O. #: 10985-001-001-9999-00
Date Received: 09-17-99

GC/MS VOLATILE

Four (4) soil samples were collected on 09-15-99.

The samples and their associated QC samples were analyzed according to criteria set forth in Recra OPs based on SW 846 Method 8260A for TCL Volatile target compounds on 09-28,29-99.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. The cooler temperature upon receipt has been recorded on the chain-of-custody.
2. The required holding time for analysis was met.
3. A non-target compound was detected in sample B0WBR6.
4. All surrogate recoveries were within EPA QC limits.
5. All matrix spike recoveries were within EPA QC limits.
6. All blank spike recoveries were within EPA QC limits.
7. The method blanks contained the common laboratory contaminants Methylene Chloride and Acetone at levels less than 2x the CRQL and the target compound 2-Butanone at levels less than the CRQL.

for
J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

11-01-99
Date

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208 Welsh Pool Road • Lionville, PA 19341-1333 • (610) 280-3000 • Fax (610) 280-3041

RECRA ENVIRONMENTAL INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report
****REVISION****

Client: TNU HANFORD B99-078
RFW #: 9909L127
SDG/SAF#: H0534/B99-078

W.O. #: #: 10985-001-001-9999-00
Date Received: 09-17-99

GC SCAN

This narrative was revised to remove references to Butanol and add references to 1-Propanol and to clarify surrogate information.

The set of samples consisted of four (4) soil samples collected on 09-15-99.

The samples and their associated QC samples were prepared on 09-23-99 and analyzed by methodology based on EPA Method 8015B for Ethanol and 1-Propanol on 09-24-99.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. The samples were packaged and stored as specified in the method protocol; the cooler temperature upon receipt has been recorded on the chain-of-custody.
2. The required holding time for analysis was met.
3. All initial calibrations associated with this data set were within acceptance criteria.
4. All continuing calibration standards analyzed prior to the sample extracts were within acceptance criteria.
5. Recra does not use surrogate spikes for this analysis. The method does not provide specific guidance regarding the use of surrogates and performance criteria. Method performance is monitored through the use of blank spikes and matrix spikes.
6. The blank spike recovery was within advisory control limits of 50%-150%.
7. All matrix spike recoveries were within advisory control limits of 50%-150%.

[signature] 01-07-00

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

Date

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RECRA ENVIRONMENTAL INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client: TNU HANFORD B99-078
RFW #: 9909L129
SDG/SAF#: H0534/B99-078

W.O. #: #: 10985-001-001-9999-00
Date Received: 09-17-99

GC SCAN

The set of samples consisted of four (4) soil samples collected on 09-14-99.

The samples and their associated QC samples were prepared on 09-23-99 and analyzed by methodology based on EPA Method 8015B for Ethanol and Butanol on 09-24-99.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. The samples were packaged and stored as specified in the method protocol; the cooler temperature upon receipt has been recorded on the chain-of-custody.

2. The required holding time for analysis was met.

3. All initial calibrations associated with this data set were within acceptance criteria.

4. All continuing calibration standards analyzed prior to the sample extracts were within acceptance criteria.

5. Surrogates were not used for this analysis.

6. The blank spike recovery was within advisory control limits of 50%-150%.

7. One (1) of two (2) matrix spike recoveries was outside the advisory control limits of 50%-150%.

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

10-15-99
Date

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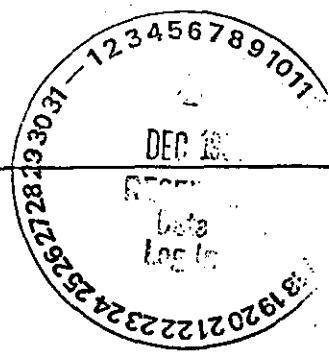
RECRA ENVIRONMENTAL INC.
Chemical and Environmental Measurement Information



Recra LabNet Philadelphia
Analytical Report

Client : TNU-HANFORD B99-078
RFW# : 9909L129
SDG/SAF#: H0534/B99-078

W.O #: 10985-001-001-9999-00
Date Received: 09-17-99

DIESEL RANGE ORGANICS

The set of samples consisted of four (4) soil samples collected on 09-14-99.

The samples and their associated QC samples were prepared on 09-22-99 and analyzed by methodology based on EPA Method 8015B for Diesel Range Petroleum Hydrocarbons on 10-07,08-99. The analysis met the intent of method WTPH-D.

1. The cooler temperature has been recorded on the chain-of-custody.
2. All required holding times for extraction and analysis were met.
3. All initial calibrations associated with this data set were within acceptance criteria.
4. All diesel continuing calibration standards analyzed prior to the sample extracts were within acceptance criteria.
5. All surrogate recoveries were within acceptance criteria.
6. The blank spike recovery was within acceptance criteria.
7. All matrix spike recoveries were within acceptance criteria.

Pat E

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

10-19-99
Date

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RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client : TNU-HANFORD B99-078
RFW# : 9909L127
SDG/SAF#: H0534/B99-078

W.O #: 10985-001-001-9999-00
Date Received: 09-17-99

DIESEL RANGE ORGANICS

The set of samples consisted of four (4) soil samples collected on 09-15-99.

The samples and their associated QC samples were prepared on 09-22-99 and analyzed by methodology based on EPA Method 8015B for Diesel Range Petroleum Hydrocarbons on 10-07-99. The analysis met the intent of method WTPH-D.

1. The cooler temperature has been recorded on the chain-of-custody.
2. All required holding times for extraction and analysis were met.
3. All initial calibrations associated with this data set were within acceptance criteria.
4. All diesel continuing calibration standards analyzed prior to the sample extracts were within acceptance criteria.
5. All surrogate recoveries were within acceptance criteria.
6. All blank spike recoveries were within acceptance criteria.
7. All matrix spike recoveries were within acceptance criteria.

Pat C

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

10-19-99
Date

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Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-119	Page 1 of 1

Collector Bowers/Trice	**Company Contact** Chris Cearlock **Telephone No.** 372-9574	**Project Coordinator** TRENT, SJ	**Price Code** 8N **Data Turnaround** 45 Days
Project Designation 200 Area Source characterization - 200-CW-1 OU	**Sampling Location** 200 Bpond (B8758) <15'	**SAF No.** B99-078	
Ice Chest No. ERC 96 065	**Field Logbook No.** EL-1511	**Method of Shipment** Fed Ex	
Shipped To TMA/RECRA 9-14-99	**Offsite Property No.** A990257	**Bill of Lading/Air Bill No.** 112357952 9550	
		COA 920CW1 67/C	

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	Cool 4C	Cool 4C	None	Cool 4C						
	Type of Container	aG	aG	aG	aG						
Special Handling and/or Storage	No. of Container(s) / Volume	1 / 60mL	1 / 250mL	1 / 250mL	1 / 500mL						
SAMPLE ANALYSIS		VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.						

Sample No.	Matrix *	Sample Date	Sample Time									
B0WBR0	Soil	9.14.99	1216	X	X		X		BOWCRO			
B0WBR1	Soil	9.14.99	1300	X	X		X		BOWCRO			
B0WBR2	Soil	9.14.99	1340	X	X		X		BOWCRO			
~~B0WBR3 9.14.99~~ a	Soil											
BOWBR4	Soil	9.14.99	1510	X	X		X		BOWCRO			

0000029

CHAIN OF POSSESSION	Sign/Print Names	Date/Time
Relinquished By	Doug Bowers	9-17-99/1700
Received By	R F IB	9-17-99/1700
Relinquished By	Refer IB	9/16/99 11:30
Received By	Brent Porter	9/16/99 11:30
Relinquished By	Brent Porter	9/16/99 11:30
Received By	Fed Express	9/16/99 11:30
Relinquished By	Fed Ex	9-17-99 :0245
Received By	Vicki Kenny	9-17-99 0245

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078. Out of Gamma Spec. bottle also analyze for Np-237, isotopic U, . Out of ICP bottle also analyze for NO2/NO3, IC anions, Sulfides, Ammonia, Total Cyanide, and pH.

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 -- Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241
(2) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Beryllium, Copper, Nickel, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

Collector unavailable to sign COC

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE	Disposal Method	Disposed By	Date/Time

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-121	Page 1 of 1

Collector: Bowers/Trice	Company Contact: Chris Cearlock — Telephone No.: 372-9574	Project Coordinator: TRENT, SJ	Price Code: 8N — Data Turnaround: 45 Days
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: 200 B pond (B8758) >15'	SAF No.: B99-078	
Ice Chest No.: ERC 96 024	Field Logbook No.: EL-1511	Method of Shipment: Fed Ex	
Shipped To: TMA/RECRA	Offsite Property No.: A990259	Bill of Lading/Air Bill No.: 423579529561	
9-15-99		COA: B20CW167IC	

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	Cool 4C	Cool 4C	None	Cool 4C						
	Type of Container	aG	aG	aG	aG						
Special Handling and/or Storage	No. of Container(s)	1	1	1	1						
	Volume	60mL	250mL	250mL	500mL						
SAMPLE ANALYSIS		VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.						

Sample No.	Matrix *	Sample Date	Sample Time									
B0WBR8	Soil	9.15.99	0945	X	X		X			BOWCA1		
~~B0WBR9~~	Soil		9/15/9									
~~B0WBT0~~	Soil		9/15/99									
~~B0WBT1~~	Soil		CT 9/15/99									

0000030

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: [signature]	Date/Time: 9/15/99 1530	Received By: [signature]	Date/Time: 9/15/99 1530
Relinquished By: REF IB	Date/Time: 91699 1300	Received By: SIGALE	Date/Time: 91699 1300
Relinquished By: SIGALE	Date/Time: 91699 1300	Received By: FED EX	Date/Time:
Relinquished By: FED EX	Date/Time: 9-17-99 1020	Received By: TT Murray	Date/Time: 9-17-99 1020

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078. Out of Gamma Spec. bottle also analyze for Np-237, isotopic U, Ni-63, Tech-99, Tritium, . Out of ICP bottle also analyze for NO2/NO3, IC anions, Sulfides, Ammonia, Total Cyanide, and pH.

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 -- Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241
(2) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Beryllium, Copper, Nickel, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

COLLECTOR UNAVAILABLE TO SIGN COC

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE	Disposal Method	Disposed By	Date/Time

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-120	Page 1 of 2

Collector Bowers/Trice	Company Contact Chris Cearlock Telephone No. 372-9574	Project Coordinator TRENT, SJ	Price Code 8N Data Turnaround 45 Days
Project Designation 200 Area Source characterization - 200-CW-1 OU	Sampling Location 200 Bpond (B8758) <15'	SAF No. B99-078	
Ice Chest No. ERC96 024	Field Logbook No. EL-1511	Method of Shipment Fed Ex	
Shipped To TMA/RECRA	Offsite Property No. A990259	Bill of Lading/Air Bill No. 423579529561	
		COA B20CW1 671C	

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	Cool 4C	Cool 4C	None	Cool 4C	None
	Type of Container	aG	aG	aG	aG	P
	No. of Container(s)	1	1	1	1	1
Special Handling and/or Storage	Volume	60mL	250mL	250mL	500mL	plastic bag
SAMPLE ANALYSIS		VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.	Perylene 5720

Sample No.	Matrix *	Sample Date	Sample Time						
~~B0WBR4~~ 9-15-99	Soil								
B0WBR5	Soil	9-15-99	0739	X	X		X		BOWCR1
B0WBR6	Soil	9-15-99	0834	X	X		X	~~X~~ 9/16/99	BOWCR1
B0WBR7	Soil	9.15.99	0834	X	X		X		BOWCR1

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By	Date/Time	Received By	Date/Time
CMc	9/15/99 1530	[illegible]	9/15/99 1530
RE IB	91699 1300	[illegible]	91699 1300
[illegible]	91699 1300	FED EX	
Fed EX	9-17-99 1020	TMurray	9-17-99 1020

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078. Out of Gamma Spec. bottle also analyze for Np-237, isotopic U, . Out of ICP bottle also analyze for NO2/NO3, IC anions, Sulfides, Ammonia, Total Cyanide, and pH.

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 – Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241

(2) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Beryllium, Copper, Nickel, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

COLLECTOR UNAVAILABLE TO SIGN COC

Matrix *: Soil, Water, Vapor, Other Solid, Other Liquid

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE	Disposal Method	Disposed By	Date/Time

E0031

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: 200-CW-1			DATA PACKAGE: H0534		
VALIDATOR: TLI		LAB: Reckt		DATE: 12/20/89	
CASE:			SDG: H0534		

ANALYSES PERFORMED

☐ CLP Volatiles	☐ SW-846 8240 (cap column)	☒ SW-846 8260 (packed column)	☐ CLP Semivolatiles	☐ SW-846 8270 (cap column)	☐ SW-846 (packed column)
☐	☐	☐	☐	☐	☐

SAMPLES/MATRIX BOWBR0 BOWBR1 BOWBR2 BOWBR4
BOWBR5 BOWBR6 BOWBR7 BOWBR8

soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . Yes No (N/A)

Is a case narrative present? . . . . . (Yes) No N/A

Comments: _____

2. HOLDING TIMES

Are sample holding times acceptable? . . . . . (Yes) No N/A

Comments: _____

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. INSTRUMENT TUNING AND CALIBRATION

Is the GC/MS tuning/performance check acceptable? . . . . . Yes No (N/A)
Are initial calibrations acceptable? . . . . . Yes No N/A
Are continuing calibrations acceptable? . . . . . Yes No N/A
Comments:

4. BLANKS

Were laboratory blanks analyzed? . . . . . (Yes) No N/A
Are laboratory blank results acceptable? . . . . . Yes (No) N/A
Were field/trip blanks analyzed? . . . . . Yes (No) N/A
Are field/trip blank results acceptable? . . . . . Yes No (N/A)
Comments: U → 0,1,~~2,3,4~~ - methylene chloride - U 2,4 to CRQL + U
- 5,6,7,8 - " " - U only
~~Benzene U to CRQL~~ ~~toluene - R1,R0~~ acetone - R5,6,7,8 - U to CRDL
2 butanone - ~~5,6,7,8~~ 5,7,8 - U at CRDL

5. ACCURACY

Were surrogates/System Monitoring Compounds analyzed? . . . . (Yes) No N/A
Are surrogate/System Monitoring Compound recoveries acceptable? (Yes) No N/A
Were MS/MSD samples analyzed? . . . . . Yes (No) N/A
Are MS/MSD results acceptable? . . . . . (Yes) No N/A
Comments: IR on MS/MSD (BRO-4)
OK for 6-8 — NO MSD J (0-4)

GC/MS ORGANIC DATA VALIDATION CHECKLIST

6. PRECISION

Are MS/MSD RPD values acceptable? . . . . . (Yes) No N/A
Are field duplicate RPD values acceptable? . . . . . (Yes) No N/A
Are field split RPD values acceptable? . . . . . Yes No (N/A)
Comments: MS/MSD ~~of~~ ok for 5-8 — 1R —

7. SYSTEM PERFORMANCE

Were internal standards analyzed? . . . . . Yes No (N/A)
Are internal standard areas acceptable? . . . . . Yes No (N/A)
Are internal standard retention times acceptable? . . . . . Yes No (N/A)
Comments:

8. COMPOUND IDENTIFICATION AND QUANTITATION

Is compound identification acceptable? . . . . . Yes No (N/A)
Is compound quantitation acceptable? . . . . . Yes No (N/A)
Comments:

9. REPORTED RESULTS AND QUANTITATION LIMITS

1R

Are results reported for all requested analyses? . . . . . (Yes) No N/A
Are all results supported in the raw data? . . . . . Yes (No) N/A
Do results meet the CRQLs? . . . . . Yes (No) N/A
Has the laboratory properly identified and coded all TIC? . . . Yes No ~~N/A~~
Comments: Chloromethane - R0, R1, R6, R8 Bromomethane R0, R1, R6, R8
Vinyl chloride, chloroethane - R0, R1, R6, R8 Acetone - R0, R1
4methyl 2pentanone + 2 Hexanone R0, R1 R6, R8 2-butanone R6

A87 000035

GENERAL GC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: 200-CW-1			DATA PACKAGE: H0534		
VALIDATOR: TLI		LAB: RecRt		DATE: 12/20/99	
CASE:			SDG: H0534		

ANALYSES PERFORMED

☐ 8010	☐ 8015 alcohol	☐ 8020	☐ 8021	8140	8141
☐ 8150	☐ 8151	☐ WTPH-HCID	☐ WTPH-G	☐ WTPH-D	☐
☐	☐	☐	☐	☐	☐

SAMPLES/MATRIX: BOWBR0 BOWBR1 BOWBR2 BOWBR2
BOWBR5 BOWBR6 BOWBR7 BOWBR8

soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . Yes No (N/A)

Is a case narrative present? . . . . . (Yes) No N/A

Comments:

2. HOLDING TIMES

Are sample holding times acceptable? . . . . . (Yes) No N/A

Comments:

A 102

GENERAL GC DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION

3.1 INITIAL CALIBRATION

Was an initial calibration performed? . . . . . Yes No (N/A)

Are %RSD values for calibration or response factors acceptable? . . . . . Yes No (N/A)

Comments:_____

3.2 CONTINUING CALIBRATION

Was a continuing calibration check performed? . . . . . Yes No (N/A)

Are %D values for calibration or response factors acceptable? . Yes No (N/A)

Comments:_____

4. BLANKS

Were laboratory blanks analyzed? . . . . . (Yes) No N/A

Are laboratory blank results acceptable? . . . . . (Yes) No N/A

Were field/trip blanks analyzed? . . . . . Yes (No) N/A

Are field/trip blank results acceptable? . . . . . Yes No (N/A)

Comments:_____

5. ACCURACY

Were surrogates analyzed? . . . . . (Yes) No N/A

Are surrogate recoveries acceptable? . . . . . Yes (No) N/A

Were MS/MSD samples analyzed? . . . . . (Yes) No N/A

Are MS/MSD recoveries acceptable? . . . . . Yes (No) N/A

Were LCS samples analyzed? . . . . . Yes No (N/A)

Are LCS recoveries acceptable? . . . . . Yes No (N/A)

A-12

GENERAL GC DATA VALIDATION CHECKLIST

Comments: Surrogate IR

n-propyl – 47% I 0,1,2,4

6. PRECISION

Are MS/MSD sample RPD values acceptable? . . . . . Yes No N/A

Are field duplicate RPD values acceptable? . . . . . Yes No N/A

Are field split RPD values acceptable? . . . . . Yes No N/A

Comments:

7. COMPOUND IDENTIFICATION AND QUANTITATION

Is compound identification acceptable? . . . . . Yes No N/A

Is compound quantitation acceptable? . . . . . Yes No N/A

Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

Are results reported for all requested analyses? . . . . . Yes No N/A

Are all results supported in the raw data? . . . . . Yes No N/A

Do results meet the CRQLs? . . . . . Yes No N/A

Comments:

A-12

GENERAL GC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200-CW-1			DATA PACKAGE: H0534		
VALIDATOR: TLI		LAB: RECRA		DATE: 12/20/99	
CASE:			SDG: H0534		

ANALYSES PERFORMED					
☐ 8010	☑ 8015 Diesel	☐ 8020	☐ 8021	8140	8141
☐ 8150	☐ 8151	☐ WTPH-HCID	☐ WTPH-G	☐ WTPH-D	☐
☐	☐	☐	☐	☐	☐

SAMPLES/MATRIX: BOWBR0 BOWBR1 BOWBR2 BOWBR4 BOWBR5 BOWBR6 BOWBR7 BOWBR8

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . Yes No (N/A)

Is a case narrative present? . . . . . (Yes) No N/A

Comments: _____

2. HOLDING TIMES

Are sample holding times acceptable? . . . . . (Yes) No N/A

Comments: _____

A-102

GENERAL GC DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION

3.1 INITIAL CALIBRATION

Was an initial calibration performed? . . . . . Yes No N/A

Are %RSD values for calibration or response factors acceptable? . . . . . Yes No N/A

Comments:_____

3.2 CONTINUING CALIBRATION

Was a continuing calibration check performed? . . . . . Yes No N/A

Are %D values for calibration or response factors acceptable? . Yes No N/A

Comments:_____

4. BLANKS

Were laboratory blanks analyzed? . . . . . Yes No N/A

Are laboratory blank results acceptable? . . . . . Yes No N/A

Were field/trip blanks analyzed? . . . . . Yes No N/A

Are field/trip blank results acceptable? . . . . . Yes No N/A

Comments:_____

5. ACCURACY

Were surrogates analyzed? . . . . . Yes No N/A

Are surrogate recoveries acceptable? . . . . . Yes No N/A

Were MS/MSD samples analyzed? . . . . . Yes No N/A

Are MS/MSD recoveries acceptable? . . . . . Yes No N/A

Were LCS samples analyzed? . . . . . Yes No N/A

Are LCS recoveries acceptable? . . . . . Yes No N/A

A-1

GENERAL GC DATA VALIDATION CHECKLIST

Comments: alcohol - No surr - J

6. PRECISION

Are MS/MSD sample RPD values acceptable? . . . . . Yes No N/A
Are field duplicate RPD values acceptable? . . . . . Yes No N/A
Are field split RPD values acceptable? . . . . . Yes No N/A
Comments:

7. COMPOUND IDENTIFICATION AND QUANTITATION

Is compound identification acceptable? . . . . . Yes No N/A
Is compound quantitation acceptable? . . . . . Yes No N/A
Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

Are results reported for all requested analyses? . . . . . Yes No N/A
Are all results supported in the raw data? . . . . . Yes No N/A
Do results meet the CRQLs? . . . . . Yes No N/A
Comments:

Review Comment Record (RCR)

1. Date	2. Review No.
2/03/00	BHI/QA0014
3. Project	4. Page
200-CW-1	Page 1 of 3

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
SDG No. H0534	200 Area Source Characterization – 200-CW-1 Operable Unit	Claude Stacey	BHI/QA	H0-16/372-9208

17. *Comment Submittal Approval:* 10. Agreement with indicated comment disposition(s) 11. CLOSED

Organization Manager (Optional) Date Reviewer/Point of Contact Date Reviewer/Point of Contact

Author/Originator Author/Originator

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
	General Comment: None of the packages had the supporting documentation for the qualifiers. The validation procedures calls to include submittal of copies data validation supporting documentation as part of the validation package. This would include missed hold time information, out of criteria matrix spike, duplication data, LCS data, etc.			
1	PCB: Page 010, indicates the CRDL to be 0.1 with the heading indicating the units to be UG/KG. The CRDL for PCB should be 100 UG/KG. This would also change the conclusion that the laboratory exceeded the detection limits on page 004.			
2	PCB: The accuracy and precision acceptance criteria do not reflect project requirements as specified in DOE/RL 99-07.			
3	Radiochemistry: Page 002, Accuracy specifies the matrix spike recovery range is 70 to 130%. This should read matrix spike recovery range is 70 to 130% or 80 to 120%, since the isotopes determined by GeLi/HPGe recovery range is 80 to 120 % as specified in the project documents.			
4	Radiochemistry: Page 003, Precision indicates acceptable RPD to be 35%; whereas, project documents has acceptance for precision to be 30%.			
5	Radiochemistry: page 010 needs a statement at bottom data indicating that Total U is in MG/KG.			

Review Comment Record (RCR)

1. Date	2. Review No.
2/03/00	BHI/QA0014
3. Project	4. Page
200-CW-1	Page 2 of 3

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
6	Radiochemistry: Page 11 the required detection limits for Co-60, Eu-152 and 154 are in different then those specified by the project. Co-60 should be 0.1, Eu-152 and 154 should be 0.2. With these changes the isotopes listed on pages 004 will need reviewed.			
7	Radiochemistry: Page 001 states the validation was conducted in accordance to document DOE/RL 98-47 draft B. The reference document should be DOE/RL 99-07 draft B.			
8	Wet Chemistry: Again the accuracy and precision acceptance criteria do not reflect project requirements.			
9	Wet Chemistry: Page 10 the header at the top of the page states that these are water samples and the results are in MG/L. The samples are soil and the results are in MG/KG.			
10	Wet Chemistry: Page 010 does not indicate a CRDL for Cr-VI. Project PQL for Cr-VI is 0.7 MG/KG.			
11	Volatiles: Again the accuracy and precision acceptance criteria do not reflect project requirements.			
12	Volatiles: The detection limits listed on page 011 do not meet the project PQL on the majority of the compounds.			
13	Semi-Volatiles: Again the accuracy and precision acceptance criteria do not reflect project requirements.			
14	Semi-Volatiles: Project documents call for the determination of tri-butyl phosphate; however, it was no analyzed for by the laboratory and no mention of the lack of tri-butyl phosphate in the validation package.			
15	Semi-Volatiles: Page 011 for SDG in the header has H0506, this should be H0534. Also on the same page, Chrysene has an * after it; however, there is nothing that indicates what the * is referring to.			
16	Inorganics: Again the accuracy and precision acceptance criteria do not reflect project requirements. Using the project acceptance criteria for MS recovery the lead results that have been qualified "J" due to low MS recovery would not require the qualification.			
17	Inorganics: Page 010 the heading at the top of the page indicates the units			

Review Comment Record (RCR)

1. Date	2. Review No.
2/03/00	BHI/QA0014
3. Project	4. Page
200-CW-1	Page 3 of 3

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
	for the data is in UG/KG; whereas, the laboratory data sheets indicate the data is in MG/KG.			
18	Inorganic: Page 010 most of the CRDL listed are not what the project required.			
	It would appear that the validator either do not have the project specific data requirements or the wrong project data requirements were used for the validation.			

BHI Sample Management
Phone: (509) 372-9346
FAX: (509) 372-9487

facsimile transmittal

To: Bruce C Fax: 5-5151

From: J. Duncan Date: 2/3/00

Re: RCRs Pages:

CC:

☐ Quick Turn / Priority Data ☐ Final Data Package

Date: 21 January 2000
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200 Area Source Characterization - 200-CW-1 Operable Unit
Subject: PCBs - Data Package No. H0534-RLN (SDG No. H0534)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0534-RLN prepared by Recra LabNet (RLN). A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B0WBR0	9/14/99	Soil	C	PCBs by EPA 8082
B0WBR1	9/14/99	Soil	C	PCBs by EPA 8082
B0WBR2	9/14/99	Soil	C	PCBs by EPA 8082
B0WBR4	9/14/99	Soil	C	PCBs by EPA 8082
B0WBR5	9/15/99	Soil	C	PCBs by EPA 8082
B0WBR6	9/15/99	Soil	C	PCBs by EPA 8082
B0WBR7	9/15/99	Soil	C	PCBs by EPA 8082
B0WBR8	9/15/99	Soil	C	PCBs by EPA 8082

Data validation was conducted in accordance with the BHI validation statement of work and the *200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan*, DOE/RL-99-07, Draft B. Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

- **Holding Times**

  Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

  If holding times are exceeded by less than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detected sample results are qualified as estimates and flagged "J" and all nondetects are rejected and flagged "UR".

  All holding times were met.

- **Blanks**

  Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation or analysis. At least one method blank analysis must be conducted for every 20 samples. Method blanks should not contain target compounds at a concentration greater than CRQL. If target compounds are present, sample results less than five times the blank concentration are qualified as undetected and flagged "U". If the sample result is less than five times the blank concentration and less than CRQL, the result is qualified as undetected and elevated to the CRQL.

  All method blank target compound results were acceptable.

- **Accuracy**

  Matrix Spike

  Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike analyses are performed in duplicate and must be within control limits of 70% to 130%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Nondetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

All matrix spike results were acceptable.

Surrogate Recovery

The analysis of surrogate compounds provides a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory. When a surrogate compound recovery is outside the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Nondetected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Nondetected compounds with surrogate recoveries above the upper control limit require no qualification.

All surrogate recovery results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. The RPD for soil samples is ≤30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All matrix spike/matrix spike duplicate results were acceptable.

Field Duplicate Samples

One pair of field duplicate samples (samples B0WBR6/B0SBR7) were submitted to RLN for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All field duplicate results were acceptable.

- **Analytical Detection Levels**

  Reported analytical detection levels are compared against the PQLs to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels were below the analyte specific PQL.

- **Completeness**

  Data Package No. H0534-RLN (SDG No. H0534) was submitted for validation and verified for completeness. The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-99-07, Draft B, *200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan*.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, but the data are usable for decision-making purposes.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H0534	REVIEWER: TLI	DATE: 1/21/00	PAGE 1 OF 1
COMMENTS: No qualifiers assigned			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

PCB ANALYSIS, SOIL MATRIX, (UG/KG)

Project: BECHTEL-HANFORD																	
Laboratory: Recra LabNet																	
Case	SDG: H0534																
Sample Number		B0WBR0		B0WBR1		B0WBR2		B0WBR4		B0WBR5		B0WBR6		B0WBR7		B0WBR8	
Location		B8758		B8758		B8758		B8758		B8758		B8758		B8758		B8758	
Remarks														Duplicate			
Sample Date		09/14/99		09/14/99		09/14/99		09/14/99		09/15/99		09/15/99		09/15/99		09/15/99	
PCB	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aroclor-1016	100	37	U	35	U	34	U	34	U	33	U	34	U	35	U	37	U
Aroclor-1221	100	73	U	71	U	68	U	68	U	67	U	69	U	69	U	73	U
Aroclor-1232	100	37	U	35	U	34	U	34	U	33	U	34	U	35	U	37	U
Aroclor-1242	100	37	U	35	U	34	U	34	U	33	U	34	U	35	U	37	U
Aroclor-1248	100	37	U	35	U	34	U	34	U	33	U	34	U	35	U	37	U
Aroclor-1254	100	37	U	35	U	34	U	34	U	33	U	34	U	35	U	37	U
Aroclor-1260	100	37	U	35	U	34	U	34	U	33	U	34	U	35	U	37	U

Recra LabNet - Lionville Laboratory

PCBs by GC

Report Date: 10/12/99 09:51

RFW Batch Number: 9909L127 Client: TNU-HANFORD B99-078 Work Order: 10985001001 Page: 1

	Cust ID:	B0WBR8	B0WBR8	B0WBR8	B0WBR5	B0WBR6	B0WBR7
Sample Information	RFW#:	001	001 MS	001 MSD	002	003	004
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate: Tetrachloro-m-xylene		102 %	102 %	110 %	110 %	98 %	102 %
Decachlorobiphenyl		98 %	99 %	105 %	107 %	98 %	98 %
Aroclor-1016		37 U	37 U	37 U	33 U	34 U	35 U
Aroclor-1221		73 U	73 U	73 U	67 U	69 U	69 U
Aroclor-1232		37 U	37 U	37 U	33 U	34 U	35 U
Aroclor-1242		37 U	37 U	37 U	33 U	34 U	35 U
Aroclor-1248		37 U	37 U	37 U	33 U	34 U	35 U
Aroclor-1254		37 U	86 %	85 %	33 U	34 U	35 U
Aroclor-1260		37 U	37 U	37 U	33 U	34 U	35 U

	Cust ID:	PBLKVF	PBLKVF BS
Sample Information	RFW#:	99LE1168-MB1	99LE1168-MB1
	Matrix:	SOIL	SOIL
	D.F.:	1.00	1.00
	Units:	UG/KG	UG/KG
Surrogate: Tetrachloro-m-xylene		105 %	100 %
Decachlorobiphenyl		100 %	95 %
Aroclor-1016		33 U	33 U
Aroclor-1221		67 U	67 U
Aroclor-1232		33 U	33 U
Aroclor-1242		33 U	33 U
Aroclor-1248		33 U	33 U
Aroclor-1254		33 U	78 %
Aroclor-1260		33 U	33 U

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

Recra LabNet - Lionville Laboratory

PCBs by GC

Report Date: 10/12/99 09:48

RFW Batch Number: 9909L129 Client: TNU-HANFORD B99-078 Work Order: 10985001001 Page: 1

	Cust ID:	B0WBR0		B0WBR0		B0WBR0		B0WBR1		B0WBR2		B0WBR4	
Sample Information	RFW#:	001		001 MS		001 MSD		002		003		004	
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	D.F.:	1.00		1.00		1.00		1.00		1.00		1.00	
	Units:	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Surrogate:	Tetrachloro-m-xylene	92	%	100	%	105	%	102	%	110	%	92	%
	Decachlorobiphenyl	89	%	93	%	97	%	98	%	106	%	91	%
			fl		fl		fl		fl		fl		fl
Aroclor-1016		37	U	37	U	36	U	35	U	34	U	34	U
Aroclor-1221		73	U	73	U	73	U	71	U	68	U	68	U
Aroclor-1232		37	U	37	U	36	U	35	U	34	U	34	U
Aroclor-1242		37	U	37	U	36	U	35	U	34	U	34	U
Aroclor-1248		37	U	37	U	36	U	35	U	34	U	34	U
Aroclor-1254		37	U	82	%	96	%	35	U	34	U	34	U
Aroclor-1260		37	U	37	U	36	U	35	U	34	U	34	U

	Cust ID:	PBLKVF		PBLKVF BS									
Sample Information	RFW#:	99LE1168-MB1		99LE1168-MB1									
	Matrix:	SOIL		SOIL									
	D.F.:	1.00		1.00									
	Units:	UG/KG		UG/KG									
Surrogate:	Tetrachloro-m-xylene	105	%	100	%								
	Decachlorobiphenyl	100	%	95	%								
			fl		fl		fl		fl		fl		fl
Aroclor-1016		33	U	33	U								
Aroclor-1221		67	U	67	U								
Aroclor-1232		33	U	33	U								
Aroclor-1242		33	U	33	U								
Aroclor-1248		33	U	33	U								
Aroclor-1254		33	U	78	%								
Aroclor-1260		33	U	33	U								

0012

AW 10-18-99

RK 1/11/00

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client: TNU-HANFORD B99-078
RFW#: 9909L129
SDG/SAF#: H0534/B99-078

W.O.#: 10985-001-001-9999-00
Date Received: 09-17-99

PCB

The set of samples consisted of four (4) soil samples collected on 09-14-99.

The samples and their associated QC samples were extracted on 09-27-99 and analyzed according to Recra OPs based on SW846, 3rd Edition procedures on 10-09-99. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8082 for Aroclors only.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. The cooler temperature has been recorded on the chain-of-custody.
2. All required holding times for extraction and analysis have been met.
3. The samples and their associated QC samples received a sulfuric acid and sulfur cleanup.
4. The method blank was below the reporting limits for all target compounds.
5. All surrogate recoveries were within acceptance criteria.
6. The blank spike recovery was within acceptance criteria.
7. All matrix spike recoveries were within acceptance criteria.
8. All initial calibrations associated with this data set were within acceptance criteria.
9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

By S t D Welsh

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

10-20-99
Date

pef\r:\group\data\pest\09L-129.pcb

208 Welsh Pool Road • Lionville, PA 19341-1333 • (610) 280-3000 • Fax (610) 280-3041

RECRA ENVIRONMENTAL INC.
Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client: TNU-HANFORD B99-078
RFW#: 9909L127 & H0534 OK 10/22/99
SDG/SAF#: H0539/B99-078

W.O.#: 10985-001-001-9999-00
Date Received: 09-17-99

PCB

The set of samples consisted of four (4) soil samples collected on 09-15-99.

The samples and their associated QC samples were extracted on 09-27-99 and analyzed according to Recra OPs based on SW846, 3rd Edition procedures on 10-08,09-99. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8082 for Aroclors only.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. The cooler temperature has been recorded on the chain-of-custody.
2. All required holding times for extraction and analysis have been met.
3. The samples and their associated QC samples received a sulfuric acid and sulfur cleanup.
4. The method blank was below the reporting limits for all target compounds.
5. All surrogate recoveries were within acceptance criteria.
6. The blank spike recovery was within acceptance criteria.
7. All matrix spike recoveries were within acceptance criteria.
8. All initial calibrations associated with this data set were within acceptance criteria.
9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

pp Steve Weston

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

10-21-99
Date

pefr:\group\data\pest\09L-127.pcb

208 Welsh Pool Road • Lionville, PA 19341-1333 • (610) 280-3000 • Fax (610) 280-3041

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-119	Page 1 of 1

Collector Bowers/Trice	**Company Contact** Chris Cearlock **Telephone No.** 372-9574	**Project Coordinator** TRENT, SJ	**Price Code** 8N **Data Turnaround** 45 Days
Project Designation 200 Area Source characterization - 200-CW-1 OU	**Sampling Location** 200 Bpond (B8758) <15'	**SAF No.** B99-078	
Ice Chest No. ERC 96 065	**Field Logbook No.** EL-1511	**Method of Shipment** Fed Ex	
Shipped To TMA/RECRA 9-14-99	**Offsite Property No.** A990257	**Bill of Lading/Air Bill No.** 1235 7952 9550	
		COA 920CW1 67/C	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	None	Cool 4C							
Type of Container	aG	aG	aG	aG							
No. of Container(s)	1	1	1	1							
Volume	60mL	250mL	250mL	500mL							
SAMPLE ANALYSIS	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.							
Sample No.	**Matrix** *	**Sample Date**	**Sample Time**								
B0WBR0	Soil	9.14.99	1216	X	X		X		BOWCRO		
B0WBR1	Soil	9.14.99	1300	X	X		X		BOWCRO		
B0WBR2	Soil	9.14.99	1340	X	X		X		BOWCRO		
~~B0WBR3 9.14.99~~ C	Soil										
BOWBR4	S-I)	9.14.99	1510	X	X		X		BOWCRO		

CHAIN OF POSSESSION	**Sign/Print Names**	
Relinquished By Doug Bowers Date/Time	Received By Date/Time	
Doug Bowers 9-17-99/1700	R.F. IB 9-17-99/1700	
Relinquished By Date/Time	Received By Date/Time	
Peter IB 9/16/99 11:30	Brent Porter 9/16/99 11:30	
Relinquished By Date/Time	Received By Date/Time	
Brent Porter 9/16/99 11:30	Fed Express 9/16/99 11:30	
Relinquished By Date/Time	Received By Date/Time	
Fed Ex 9-17-99 :0245	Vicki Kenny 9-17-99 0245	

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078. Out of Gamma Spec. bottle also analyze for Np-237, isotopic U, . Out of ICP bottle also analyze for NO2/NO3, IC anions, Sulfides, Ammonia, Total Cyanide, and pH.

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 -- Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241
(2) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Beryllium, Copper, Nickel, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

Collector unavailable to sign COC

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

0000016

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-121	Page 5 of 12

Collector Bowers/Trice	Company Contact Chris Cearlock / Telephone No. 372-9574	Project Coordinator TRENT, SJ	Price Code 8N / Data Turnaround 45 Days
Project Designation 200 Area Source characterization - 200-CW-1 OU	Sampling Location 200 B pond (B8758) >15'	SAF No. B99-078	
Ice Chest No. ERC 96 024	Field Logbook No. EL-1511	Method of Shipment Fed Ex	
Shipped To TMA/RECRA	Offsite Property No. A990259	Bill of Lading/Air Bill No. 423579529561	
9-15-99		COA B20CW167K	

POSSIBLE SAMPLE HAZARDS/REMARKS													
	Preservation	Cool 4C	Cool 4C	None	Cool 4C								
	Type of Container	aG	aG	aG	aG								
	No. of Container(s)	1	1	1	1								
Special Handling and/or Storage	Volume	60mL	250mL	250mL	500mL								
SAMPLE ANALYSIS		VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.								

Sample No.	Matrix *	Sample Date	Sample Time										
B0WBR8	Soil	9 15 99	0945	X	X		X			B0WCA1			
~~B0WBR9~~	~~Soil~~		9/15/9										
~~B0WBT0~~	~~Soil~~		9/15/99										
~~B0WBT1~~	~~Soil~~		CT 9/15/99										

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By	Date/Time	Received By	Date/Time
Cthu	9/15/99 1530	RF IB	9/15/99 1530
RCF IB	9/16/99 1300	SIGALE S Gale	9/16/99 1300
SIGALE S Gale	9/16/99 1300	FED EX	
Fed Ex	9-17-99 1020	T Murray	9-17-99 1020

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078. Out of Gamma Spec. bottle also analyze for Np-237, isotopic U, Ni-63, Tech-99, Tritium, . Out of ICP bottle also analyze for NO2/NO3, IC anions, Sulfides, Ammonia, Total Cyanide, and pH.

(1) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-155}; Gamma Spec - Add-on {Americium-241}; Strontium-89,90 -- Total Sr; Total Uranium {Uranium}; Isotopic Plutonium; Isotopic Thorium {Thorium-232}; Americium-241

(2) ICP Metals - 6010A (Supertrace) {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; ICP Metals - 6010A (Supertrace Add-On) {Beryllium, Copper, Nickel, Vanadium, Zinc}; Mercury - 7471 - (CV); Chromium Hex - 7196

COLLECTOR UNAVAILABLE TO SIGN COC

Matrix *: Soil, Water, Vapor, Other Solid, Other Liquid

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

0000177

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		B99-078-120	Page 1 of 2
Collector Bowers/Trice		Company Contact Chris Cearlock	Telephone No. 372-9574	Project Coordinator TRENT, SJ	Price Code 8N	Data Turnaround 45 Days
Project Designation 200 Area Source characterization - 200-CW-1 OU		Sampling Location 200 Bpond (B8758) <15'		SAF No. B99-078		
Ice Chest No. ERC 96 024		Field Logbook No. EL-1511		Method of Shipment Fed Ex		
Shipped To TMA/RECRA FedEx 9-15-99		Offsite Property No. A990259		Bill of Lading/Air Bill No. 423579529561		
				COA B20CW1671C		

POSSIBLE SAMPLE HAZARDS/REMARKS Special Handling and/or Storage	Preservation	Cool 4C	Cool 4C	None	Cool 4C	N*H*C					
	Type of Container	aG	aG	aG	aG	P					
	No. of Container(s) Volume	1 60mL	1 250mL	1 250mL	1 500mL	1 plastic bag					
SAMPLE ANALYSIS		VOA - 8260A (TCL); VOA - 8260A (Add-On) [1-Propanol, Ethanol]	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.	Particle Size					

Sample No.	Matrix *	Sample Date	Sample Time									
B0WBR4 DUP 9-15-99	Soil	9-15-99										
B0WBR5	Soil	9.15.99	0739	X	X		X				Bowc R1	
B0WBR6	Soil	9-15-99	0834	X	X		X	X 9/16/99			Bowc R1	
B0WBR7	Soil	9.15.99	0834	X	X		X				Bowc R1	

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By C Mc	Date/Time 9/15/99 1530	Received By Ref IB	Date/Time 9/15/99 1530
Relinquished By REF IB	Date/Time 9/16/99 1300	Received By SJ Trent	Date/Time 9/16/99 1300
Relinquished By SJ Trent	Date/Time 9/16/99 1300	Received By FED EX	Date/Time
Relinquished By FedEx	Date/Time 9-17-99 1020	Received By TM Jurey	Date/Time 9-17-99 1020

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078. Out of Gamma Spec. bottle also analyze for Np-237, isotopic U, . Out of ICP bottle also analyze for NO2/NO3, IC anions, Sulfides, Ammonia, Total Cyanide, and pH.

(1) Gamma Spectroscopy [Cesium-137, Cobalt-60, Europium-152, Europium-155]; Gamma Spec - Add-on [Americium-241]; Strontium-89,90 -- Total Sr; Total Uranium [Uranium]; Isotopic Plutonium; Isotopic Thorium [Thorium-232]; Americium-241
(2) ICP Metals - 6010A (Supertrace) [Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver]; ICP Metals - 6010A (Supertrace Add-On) [Beryllium, Copper, Nickel, Vanadium, Zinc]; Mercury - 7471 - (CV); Chromium Hex - 7196

COLLECTOR UNAVAILABLE TO SIGN COC

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

00078 4

Appendix 5

Data Validation Supporting Documentation

PESTICIDE/PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200-CW-1			DATA PACKAGE: H0534		
VALIDATOR: TLI		LAB: RECRA		DATE: 12/20/89	
CASE:			SDG: H0534		
ANALYSES PERFORMED					
☐ CLP3/90	☐ SW-846 8080	☐ SW-846 8081	☒ 8082	☐	☐
SAMPLES/MATRIX BOWBR0 BOWBR1 BOWBR2 BOWBR4 BOWBR5 BOWBR6 BOWBR7 BOWBR8					
Soil					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . Yes No (N/A)

Is a case narrative present? . . . . . (Yes) No N/A

Comments: _____

2. HOLDING TIMES

Are sample holding times acceptable? . . . . . (Yes) No N/A

Comments: _____

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

3.1 INSTRUMENT PERFORMANCE (METHOD 8080 AND 8081)

Are DDT retention times acceptable . . . . . Yes No (N/A)

Are calibration standard retention times acceptable? . . . . . Yes No (N/A)

Are DDT and endrin breakdowns acceptable? . . . . . Yes No (N/A)

PESTICIDE/PCB DATA VALIDATION CHECKLIST

Are DBC retention times acceptable? . . . . . Yes No N/A
Is the GC/MS tuning/performance check acceptable? . . . . . Yes No N/A
Comments:_____

3.2 CALIBRATIONS (METHOD 8080 AND 8081)

Are EVAL standard calibration factors and %RSD values acceptable? . . . . . Yes No N/A
Are quantitation column calibration factor %RSD values acceptable? . . . . . Yes No N/A
Were the analytical sequence requirements met? . . . . . Yes No N/A
Are continuing calibration %D values acceptable? . . . . . Yes No N/A
Comments:_____

3.3 INSTRUMENT PERFORMANCE AND INITIAL CALIBRATION (3/90 SOW)

Was the initial calibration sequence performed? . . . . . Yes No N/A
Was the resolution acceptable in the resolution check mix? . . Yes No N/A
Is resolution acceptable in the PEM, INDA and INDB? . . . . . Yes No N/A
Are DDT and Endrin breakdowns acceptable? . . . . . Yes No N/A
Are retention times in PEMs and calibration mixes acceptable? . Yes No N/A
Are RPD values in the PEMs acceptable? . . . . . Yes No N/A
Are %RSD values acceptable? . . . . . Yes No N/A
Comments:_____

3.4 CALIBRATION VERIFICATION (3/90 SOW)

Were the analytical sequence requirements met? . . . . . Yes No N/A
Is resolution acceptable in the PEMs? . . . . . Yes No N/A
Are initial calibrations acceptable? . . . . . Yes No N/A

A-6

PESTICIDE/PCB DATA VALIDATION CHECKLIST

Are retention times acceptable in the PEMs, INDA and INDB mixes?	Yes	No	N/A
Are RPD values in the PEMs acceptable?	Yes	No	N/A
Are the DDT and endrin breakdowns acceptable?	Yes	No	N/A
Was GPC cleanup performed?	Yes	No	N/A
Is the GPC calibration check acceptable?	Yes	No	N/A
Was Florisil cleanup performed?	Yes	No	N/A
Is the Florisil performance check acceptable?	Yes	No	N/A

Comments:_____

4. BLANKS

Were laboratory blanks analyzed?	Yes	No	N/A
Are laboratory blank results acceptable?	Yes	No	N/A
Were field/trip blanks analyzed?	Yes	No	N/A
Are field/trip blank results acceptable?	Yes	No	N/A

Comments:_____

5. ACCURACY

Were surrogates analyzed?	Yes	No	N/A
Are surrogate recoveries acceptable?	Yes	No	N/A
Were MS/MSD samples analyzed?	Yes	No	N/A
Are MS/MSD results acceptable?	Yes	No	N/A
Were LCS samples analyzed?	Yes	No	N/A
Are LCS results acceptable?	Yes	No	N/A

Comments:_____

AGT

PESTICIDE/PCB DATA VALIDATION CHECKLIST

6. PRECISION

Are MS/MSD RPD values acceptable? . . . . . Yes No N/A
Are laboratory duplicate results acceptable? . . . . . Yes No N/A
Are field duplicate RPD values acceptable? . . . . . Yes No N/A
Are field split RPD values acceptable? . . . . . Yes No N/A
Comments:_____

7. SYSTEM PERFORMANCE

Is chromatographic performance acceptable? . . . . . Yes No N/A
Are positive results resolved acceptably? . . . . . Yes No N/A
Comments:_____

8. COMPOUND IDENTIFICATION AND QUANTITATION

Is compound identification acceptable? . . . . . Yes No N/A
Is compound quantitation acceptable? . . . . . Yes No N/A
Comments:_____

9. REPORTED RESULTS AND QUANTITATION LIMITS

Are results reported for all requested analyses? . . . . . Yes No N/A
Are all results supported in the raw data? . . . . . Yes No N/A
Do results meet the CRQLs? . . . . . Yes No N/A
Comments:_____

Date: 21 January 2000
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200 Area Source Characterization - 200-CW-1 Operable Unit
Subject: Wet Chemistry - Data Package No. H0534-RLN (SDG No. H0534)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0534-RLN prepared by Recra LabNet (RLN). A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B0WBR0	9/14/99	Soil	C	See note 1
B0WBR1	9/14/99	Soil	C	See note 1
B0WBR2	9/14/99	Soil	C	See note 1
B0WBR4	9/14/99	Soil	C	See note 1
B0WBR5	9/15/99	Soil	C	See note 1
B0WBR6	9/15/99	Soil	C	See note 1
B0WBR7	9/15/99	Soil	C	See note 1
B0WBR8	9/15/99	Soil	C	See note 1

1 - IC Anions - 300.0 chloride, fluoride, nitrate, nitrite, phosphate, sulfate); ammonia - 350.3; cyanide - 9010B; pH - 9045; sulphide - 9030B; chromium-VI - 7196A; nitrate/nitrite - 353.2.

Data validation was conducted in accordance with the BHI validation statement of work and the *200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan*, DOE/RL-99-07, Draft B. Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

- **Holding Times**

  Analytical holding times are assessed to ascertain whether the holding time requirements have been met by the laboratory. The holding time requirements are as follows: 30 days for chromium VI; 28 days for ammonia, nitrate/nitrite and IC anions (chloride, fluoride, and sulfate); 14 days for cyanide; 7 days for sulfide; 2 days for IC anion (phosphate, nitrate and nitrite); and immediate for pH.

  If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

  Holding times were met for all parameters and samples.

- **Blanks**

  Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. All blank results must fall below the CRQL to be acceptable.

  All method blank results were acceptable.

- **Accuracy**

  Matrix Spike

  Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must fall within the range of 70% to 130%. Samples with a spike recovery of less than 30% and a sample value below the IDL are rejected and flagged "UR". Samples with a spike recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified "J". Finally, for samples with a spike recovery greater than 130% and a sample result less than the IDL, no qualification is required.

All matrix spike recovery results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Laboratory duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Results must be within RPD limits of plus or minus 30% for solid samples. If RPD values are out of specification and the sample concentration is greater than five times the PQL/CRQL, all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus two times the PQL/CRQL and the sample concentration is less than five times the PQL/CRQL, all associated sample results are qualified as estimated and flagged "J/UJ". The performance criteria for aqueous laboratory duplicates are an RPD less than 20% for positive sample results greater than five times the PQL/CRQL or plus or minus the PQL/CRQL for positive sample results less than five times the PQL/CRQL. Sample results outside the criteria are qualified as estimates and flagged "J/UJ".

Due to the lack of a duplicate analysis, all cyanide results in samples B0WBR5, B0WBR6, B0WBR7 and B0WBR8 were qualified as estimates and flagged "J".

All other laboratory duplicate results were within the required control limits.

Field Duplicate Samples

One pair of field duplicate samples (samples B0WBR6/B0WBR7) were submitted to TNU for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. The RPD for nitrate and nitrate/nitrite were outside QC limits. Under the BHI statement of work, no qualification is required. All other field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the CRDL to ensure that laboratory detection levels meet the required criteria. The following reported detection limits were above the CRDL: All undetected fluoride, nitrite, nitrate and ammonia results. Under the BHI statement of work, no qualification is required. All other reported laboratory detection levels met the analyte specific CRDL.

- **Completeness**

  Data Package No. H0534-RLN (SDG No. H0534) was submitted for validation and verified for completeness. The completion rate was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to the lack of a duplicate analysis, all cyanide results in samples B0WBR5, B0WBR6, B0WBR7 and B0WBR8 were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

The following reported detection limits were above the CRDL: All undetected fluoride, nitrite, nitrate and ammonia results. Under the BHI statement of work, no qualification is required.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-99-07, Draft B, *200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan.*

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with WHC procedures are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, but the data are usable for decision-making purposes.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H0534	REVIEWER: TLI	DATE: 1/21/00	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Cyanide	J	B0WBR5, B0WBR6, B0WBR7, B0WBR8	No duplicate analysis

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

GENERAL CHEMISTRY ANALYSIS, SOIL MATRIX, (MG/KG) Page__1__of__1__

Project: BECHTEL-HANFORD																	
Laboratory: Recra LabNet																	
Case	SDG: H0534																
Sample Number		B0WBR0		B0WBR1		B0WBR2		B0WBR4		B0WBR5		B0WBR6		B0WBR7		B0WBR8	
Location		B8758		B8758		B8758		B8758		B8758		B8758		B8758		B8758	
Remarks																	
Sample Date		9/14/99		9/14/99		9/14/99		9/14/99		9/15/99		9/15/99		9/15/99		9/15/99	
General Chemistry	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chloride	2	3.4		6.0		1.5		1.5		2.0		3.2		2.7		2.2	
Fluoride	1	2.8	U	2.7	U	2.6	U	2.6	U	2.5	U	2.6	U	2.6	U	1.4	U
Nitrite	1	1.4	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.4	U
Nitrate	0.2	24		4.0		1.3	U	1.3	U	4.7		9.9		5.4		8.5	
Cyanide	1	0.55	U	0.54	U	0.52	U	0.51	U	0.51	UJ	0.53	UJ	0.52	UJ	0.55	UJ
Phosphate by IC	6	1.4	U	1.6		1.6		1.4		2.8		3.8		3.2		1.4	U
Chromium VI	0.7	0.44	U	0.43	U	0.41	U	0.41	U	0.41	U	0.42	U	0.42	U	0.44	U
Sulfate by IC	10	198		139		4.4		6.2		29.0		37.5		34.1		40.9	
Nitrate/Nitrite		6.5		1.2		0.91		1.3		1.2		2.4		1.5		2.8	
Ammonia	0.5	1.4	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	U	1.3	U	1.3	U	1.4	U
Ph*		8.2		8.2		8.8		8.9		8.8		8.7		9.2		8.6	
Sulfide	20	3.8		1.1	U	1.0	U	3.5		1.0	U	4.0		4.0		1.1	U
* - Units are pH units																	

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 12/01/99

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9909L129

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B0WBR0	% Solids	90.6		%	0.01	1.0
		Chloride by IC	3.4		MG/KG	1.4	1.0
		Fluoride by IC	2.8	u	MG/KG	2.8	1.0
		Nitrite by IC	1.4	u	MG/KG	1.4	1.0
		Nitrate by IC	24		MG/KG	1.4	1.0
		Cyanide, Total	0.55	u	MG/KG	0.55	1.0
		Phosphate by IC	1.4	u	MG/KG	1.4	1.0
		Chromium VI	0.44	u	MG/KG	0.44	1.0
		Sulfate by IC	198		MG/KG	13.8	10.0
		Nitrate Nitrite	6.5		MG/KG	0.22	1.0
		Ammonia, as N	1.4	u	MG/KG	1.4	1.0
		pH	8.2		SOIL PH	0.01	1.0
		Sulfide	3.8		MG/KG	1.1	1.0
-002	B0WBR1	% Solids	92.9		%	0.01	1.0
		Chloride by IC	6.0		MG/KG	1.3	1.0
		Fluoride by IC	2.7	u	MG/KG	2.7	1.0
		Nitrite by IC	1.3	u	MG/KG	1.3	1.0
		Nitrate by IC	4.0		MG/KG	1.3	1.0
		Cyanide, Total	0.54	u	MG/KG	0.54	1.0
		Phosphate by IC	1.6		MG/KG	1.3	1.0
		Chromium VI	0.43	u	MG/KG	0.43	1.0
		Sulfate by IC	139		MG/KG	13.5	10.0
		Nitrate Nitrite	1.2		MG/KG	0.21	1.0
		Ammonia, as N	1.3	u	MG/KG	1.3	1.0
		pH	8.2		SOIL PH	0.01	1.0
		Sulfide	1.1	u	MG/KG	1.1	1.0
-003	B0WBR2	% Solids	97.0		%	0.01	1.0
		Chloride by IC	1.5		MG/KG	1.3	1.0
		Fluoride by IC	2.6	u	MG/KG	2.6	1.0
		Nitrite by IC	1.3	u	MG/KG	1.3	1.0
		Nitrate by IC	1.3	u	MG/KG	1.3	1.0
		Cyanide, Total	0.52	u	MG/KG	0.52	1.0
		Phosphate by IC	1.6		MG/KG	1.3	1.0
		Chromium VI	0.41	u	MG/KG	0.41	1.0
		Sulfate by IC	4.4		MG/KG	1.3	1.0
		Nitrate Nitrite	0.91		MG/KG	0.21	1.0
		Ammonia, as N	1.3	u	MG/KG	1.3	1.0
		pH	8.8		SOIL PH	0.01	1.0

11/21/02

011

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 12/01/99

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9909L129

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-003	B0WBR2	Sulfide	1.0 u	MG/KG	1.0	1.0
-004	B0WBR4	% Solids	97.9	%	0.01	1.0
		Chloride by IC	1.5	MG/KG	1.3	1.0
		Fluoride by IC	2.6 u	MG/KG	2.6	1.0
		Nitrite by IC	1.3 u	MG/KG	1.3	1.0
		Nitrate by IC	1.3 u	MG/KG	1.3	1.0
		Cyanide, Total	0.51 u	MG/KG	0.51	1.0
		Phosphate by IC	1.4	MG/KG	1.3	1.0
		Chromium VI	0.41 u	MG/KG	0.41	1.0
		Sulfate by IC	6.2	MG/KG	1.3	1.0
		Nitrate Nitrite	1.3	MG/KG	0.20	1.0
		Ammonia, as N	1.3 u	MG/KG	1.3	1.0
		pH	8.9	SOIL PH	0.01	1.0
		Sulfide	3.5	MG/KG	1.0	1.0

11/21/00

012

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 12/01/99

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9909L127

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	BOWBR8	% Solids	90.9		%	0.01	1.0
		Chloride by IC	2.2		MG/KG	1.4	1.0
		Fluoride by IC	1.4	u	MG/KG	1.4	1.0
		Nitrite by IC	1.4	u	MG/KG	1.4	1.0
		Nitrate by IC	8.5		MG/KG	1.4	1.0
		Cyanide, Total	0.55	u J	MG/KG	0.55	1.0
		Phosphate by IC	1.4	u	MG/KG	1.4	1.0
		Chromium VI	0.44	u	MG/KG	0.44	1.0
		Sulfate by IC	40.9		MG/KG	1.4	1.0
		Nitrate Nitrite	2.8		MG/KG	0.22	1.0
		Ammonia, as N	1.4	u	MG/KG	1.4	1.0
		pH	8.6		SOIL PH	0.01	1.0
		Sulfide	1.1	u	MG/KG	1.1	1.0
-002	BOWBR5	% Solids	98.1		%	0.01	1.0
		Chloride by IC	2.0		MG/KG	1.3	1.0
		Fluoride by IC	2.5	u	MG/KG	2.5	1.0
		Nitrite by IC	1.3	u	MG/KG	1.3	1.0
		Nitrate by IC	4.7		MG/KG	1.3	1.0
		Cyanide, Total	0.51	u J	MG/KG	0.51	1.0
		Phosphate by IC	2.8		MG/KG	1.3	1.0
		Chromium VI	0.41	u	MG/KG	0.41	1.0
		Sulfate by IC	29.0		MG/KG	1.3	1.0
		Nitrate Nitrite	1.2		MG/KG	0.20	1.0
		Ammonia, as N	1.3	u	MG/KG	1.3	1.0
		pH	8.8		SOIL PH	0.01	1.0
		Sulfide	1.0	u	MG/KG	1.0	1.0
-003	BOWBR6	% Solids	94.6		%	0.01	1.0
		Chloride by IC	3.2		MG/KG	1.3	1.0
		Fluoride by IC	2.6	u	MG/KG	2.6	1.0
		Nitrite by IC	1.3	u	MG/KG	1.3	1.0
		Nitrate by IC	9.9		MG/KG	1.3	1.0
		Cyanide, Total	0.53	u J	MG/KG	0.53	1.0
		Phosphate by IC	3.8		MG/KG	1.3	1.0
		Chromium VI	0.42	u	MG/KG	0.42	1.0
		Sulfate by IC	37.5		MG/KG	1.3	1.0
		Nitrate Nitrite	2.4		MG/KG	0.21	1.0
		Ammonia, as N	1.3	u	MG/KG	1.3	1.0
		pH	8.7		SOIL PH	0.01	1.0

1/2 1/00

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 12/01/99

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9909L127

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-003	BOWBR6	Sulfide	4.0		MG/KG	1.1	1.0
-004	BOWBR7	% Solids	95.7		%	0.01	1.0
		Chloride by IC	2.7		MG/KG	1.3	1.0
		Fluoride by IC	2.6	u	MG/KG	2.6	1.0
		Nitrite by IC	1.3	u	MG/KG	1.3	1.0
		Nitrate by IC	5.4		MG/KG	1.3	1.0
		Cyanide, Total	0.52	u J	MG/KG	0.52	1.0
		Phosphate by IC	3.2		MG/KG	1.3	1.0
		Chromium VI	0.42	u	MG/KG	0.42	1.0
		Sulfate by IC	34.1		MG/KG	1.3	1.0
		Nitrate Nitrite	1.5		MG/KG	0.21	1.0
		Ammonia, as N	1.3	u	MG/KG	1.3	1.0
		pH	9.2		SOIL PH	0.01	1.0
		Sulfide	4.0		MG/KG	1.0	1.0

11/21/00

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

RECRA ENVIRONMENTAL INC.
Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client : TNU-HANFORD B99-078
RFW# : 9909L127 and 9909L129
SDG# : H0534
SAF# : B99-078

W.O. # : 10985-001-001-9999-00
Date Received: 09-17-99

INORGANIC CASE NARRATIVE

1. This narrative covers the analyses of 8 soil samples.

2. The samples were prepared and analyzed in accordance with the methods indicated on the attached glossary.

3. Sample holding times as required by the method and/or contract were met with the exception of Sulfide samples and matrix quality control analyses for Total Cyanide sample B0WBR0.

4. The cooler temperatures were recorded on the chain-of-custodies.

5. The method blanks were within method criteria.

6. The Laboratory Control Samples (LCS) were within the laboratory control limits. The duplicate LCS were within the 20% Relative Percent Difference (RPD) control limit.

7. The matrix spike recoveries were within the 75-125% control limits; matrix spike recovery for Nitrate Nitrite was based on the replicate analysis result. The matrix spike duplicates were within the 20% RPD control limit.

8. The replicate analyses were within the 20% RPD control limit.

9. Results for solid samples are reported on a dry weight basis.

Pat E

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

12-1-99
Date

njp\109-127,129

208 Welsh Pool Road • Lionville, PA 19341-1333 • (610) 280-3000 • Fax (610) 280-3041

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-119	Page 1 of 1

Collector Bowers/Trice	**Company Contact** Chris Cearlock	**Telephone No.** 372-9574	**Project Coordinator** TRENT, SJ
Project Designation 200 Area Source characterization - 200-CW-1 OU	**Sampling Location** 200 Bpond (B8758) <15'		**SAF No.** B99-078
Ice Chest No. ERC 96 065	**Field Logbook No.** EL-1511		**Method of Shipment** Fed Ex
Shipped To TMA/RECRA 9-14-99	**Offsite Property No.** A990257		**Bill of Lading/Air Bill No.** 4235 7952 9550
			COA B20CW1 671C

Price Code 8N **Data Turnaround** 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	None	Cool 4C
Type of Container	aG	aG	aG	aG
No. of Container(s)	1	1	1	1
Volume	60mL	250mL	250mL	500mL
SAMPLE ANALYSIS	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.

Sample No.	Matrix *	Sample Date	Sample Time	VOA	Semi-VOA	Item (1)	Item (2)		
B0WBR0	Soil	9.14.99	1216	X	X		X		B0WCR0
B0WBR1	Soil	9.14.99	13 00	X	X		X		B0WCR0
B0WBR2	Soil	9.14.99	13 40	X	X		X		B0WCR0
~~B0WBR3~~ 9.14.99	Soil								
B0WBR4	Soil	9.14.99	15 10	X	X		X		B0WCR0

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
Doug Bowers	9-17-99/1700	R F IB	9-17-99/1700
Refer IB	9/16/99 11:30	Brent Porter	9/16/99 11:30
Brent Porter	9/16/99 11:30	Fed Express	9/16/99 11:30
[illegible]	9-17-99 0245	Vicki Henry	9-17-99 0245

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078. Out of Gamma Spec. bottle also analyze for Np-237, isotopic U, . Out of ICP bottle also analyze for NO2/NO3, IC anions, Sulfides, Ammonia, Total Cyanide, and pH.

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 -- Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241
(2) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Beryllium, Copper, Nickel, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

Collector unavailable to sign COC

Matrix * Soil, Water, Vapor, Other Solid, Other Liquid

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

000017

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-120	Page 1 of 1 2

Collector: Bowers/Trice	Company Contact: Chris Cearlock	Telephone No.: 372-9574	Project Coordinator: TRENT, SJ	Price Code 8N; Data Turnaround: 45 Days
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: 200 Bpond (B8758) <15'		SAF No.: B99-078	
Ice Chest No.: ERC96 024	Field Logbook No.: EL-1511		Method of Shipment: Fed Ex	
Shipped To: TMA/RECRA	Offsite Property No.: A990259		Bill of Lading/Air Bill No.: 4235795 29561	
			COA: B20CW1 671C	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	None	Cool 4C	None						
Type of Container	aG	aG	aG	aG	p						
No. of Container(s)	1	1	1	1	1						
Volume	60mL	250mL	250mL	500mL	plastic bag						
SAMPLE ANALYSIS	VOA - 8260A (TCL); VOA - 8260A (Add-On) {1-Propanol, Ethanol}	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.	particle size						

Sample No.	Matrix *	Sample Date	Sample Time										
~~B0WBR4~~ 028 9-15-99	Soil												
B0WBR5	Soil	~~5~~ 9.15.99	0739	X	X		X				BOWCR1		
B0WBR6	Soil	9.15.99	0834	X	X		X	~~X~~ 9/16/99			BOWCR1		
B0WBR7	Soil	9.15.99	0834	X	X		X				BOWCR1		

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
[signature]	9/15/99 1530	[signature]	9/15/99 1530
[signature]	9/16/99 1300	EJ GALES [signature]	9/16/99 1300
SWALES [signature]	9/16/99 1300	FED EX	
Fed Ex	9-17-99 1020	T Murray	9-17-99 1020

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078. Out of Gamma Spec. bottle also analyze for Np-237, isotopic U, . Out of ICP bottle also analyze for NO2/NO3, IC anions, Sulfides, Ammonia, Total Cyanide, and pH.

(1) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-155}; Gamma Spec - Add-on {Americium-241}; Strontium-89,90 -- Total Sr; Total Uranium {Uranium}; Isotopic Plutonium; Isotopic Thorium {Thorium-232}; Americium-241
(2) ICP Metals - 6010A (Supertrace) {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; ICP Metals - 6010A (Supertrace Add-On) {Beryllium, Copper, Nickel, Vanadium, Zinc}; Mercury - 7471 - (CV); Chromium Hex - 7196

COLLECTOR UNAVAILABLE TO SIGN COC

Matrix *: Soil, Water, Vapor, Other Solid, Other Liquid

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

0001823

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-121	Page 1 of 12

Collector Bowers/Trice	**Company Contact** Chris Cearlock **Telephone No.** 372-9574	**Project Coordinator** TRENT, SJ	**Price Code** 8N **Data Turnaround** 45 Days
Project Designation 200 Area Source characterization - 200-CW-1 OU	**Sampling Location** 200 B pond (B8758) >15'	**SAF No.** B99-078	
Ice Chest No. ERC 96 024	**Field Logbook No.** EL-1511	**Method of Shipment** Fed Ex	
Shipped To TMA/RECRA	**Offsite Property No.** A990259	**Bill of Lading/Air Bill No.** 423579529561	
SAB 9-15-99		**COA** B20CW167IC	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	None	Cool 4C								
Type of Container	aG	aG	aG	aG								
No. of Container(s)	1	1	1	1								
Volume	60mL	250mL	250mL	500mL								
SAMPLE ANALYSIS	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.								

Sample No.	Matrix *	Sample Date	Sample Time									
B0WBR8	Soil	9.15.99	0945	X	X		X			BOWCA1		
B0WBR9	Soil		9/5/9									
B0WBT0	Soil		9/15/99									
B0WBT1	Soil		CT 9/15/99									

GT0000

CHAIN OF POSSESSION — **Sign/Print Names**

Relinquished By	Date/Time	Received By	Date/Time
[signature]	9/15/99 1530	[signature]	9/15/99 1530
Relinquished By	Date/Time	Received By	Date/Time
REFIB	91699 1300	SIGALE	91699 1300
Relinquished By	Date/Time	Received By	Date/Time
SIGALE	91699 1300	FED EX	
Relinquished By	Date/Time	Received By	Date/Time
FedEx	9-17-99 1020	TMurray	9-17-99 1020

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078. Out of Gamma Spec. bottle also analyze for Np-237, isotopic U, Ni-63, Tech-99, Tritium, . Out of ICP bottle also analyze for NO2/NO3, IC anions, Sulfides, Ammonia, Total Cyanide, and pH.

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 -- Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241
(2) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Beryllium, Copper, Nickel, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

COLLECTOR UNAVAILABLE TO SIGN COC

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

Appendix 5

Data Validation Supporting Documentation

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: 200-CW-1			DATA PACKAGE: H0534		
VALIDATOR: TLI		LAB: Reckt		DATE: 12/20/95	
CASE:			SDG: H0534		

ANALYSES PERFORMED

☒ Anions/IC	☐ TOC	☐ TOX	☐ TPH-418.1	Oil and Grease	Alkalinity
☒ Ammonia	☐ BOD/COD	☐ Chloride	☐ Chromium-VI	☒ pH	☒ NO_3/NO_2
☐ Sulfate	☐ TDS	☐ TKN	☐ Phosphate	☒ Sulph.	☒ Cyan.
☒ CLP	☐	☐	☐	☐	☐

SAMPLES/MATRIX BOWBR0 BOWBR1 BOWBR2 BOWBR4 BOWBR5 BOWBR6 BOWBR7 BOWBR8

Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . Yes No (N/A)

Is a case narrative present? . . . . . (Yes) No N/A

Comments: _____

2. HOLDING TIMES

Are sample holding times acceptable? . . . . . (Yes) No N/A

Comments: _____

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION

Was initial calibration performed for all applicable analyses?	Yes	No	N/A
Are initial calibration results acceptable?	Yes	No	N/A
Was a calibration check performed for all applicable analyses?	Yes	No	N/A
Are calibration check results acceptable?	Yes	No	N/A

Comments:

4. BLANKS

Were laboratory blanks analyzed?	Yes	No	N/A
Are laboratory blank results acceptable?	Yes	No	N/A
Were field/trip blanks analyzed?	Yes	No	N/A
Are field/trip blank results acceptable?	Yes	No	N/A

Comments:

5. ACCURACY

Were spike samples analyzed at the required frequency?	Yes	No	N/A
Are spike recoveries acceptable?	Yes	No	N/A
Were LCS analyses performed at the required frequency?	Yes	No	N/A
Are LCS recoveries acceptable?	Yes	No	N/A

Comments: No organic MS/MSD 5,4,7,8 ~~- Jodi~~ not required
~~No ammon MS 0,1,2,4 - Jodi~~ (ran LCS)

6. PRECISION

Were laboratory duplicate samples analyzed at the required frequency?	~~Yes~~	~~No~~	N/A (NO)
Are laboratory duplicate sample RPD values acceptable?	Yes	No	N/A
Are field duplicate RPD values acceptable?	Yes	No	N/A
Are field split RPD values acceptable?	Yes	No	N/A

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

Comments: No dup for pH - Falls
BR4/BR7 → No cyanide dup 5,6,7,8 - +
nitrate out NO2/NO3

7. ANALYTE QUANTITATION

Was analyte quantitation performed properly? . . . . . Yes No (N/A)

Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

Are results reported for all requested analyses? . . . . . (Yes) No N/A
Are results supported in the raw data? . . . . . Yes No (N/A)
Are results calculated properly? . . . . . Yes No (N/A)
Do results meet the CRDLs? . . . . . Yes (No) N/A

Comments: ammonia - all over
cyanide - all over
nitrite - all over
nitrate - all ~~under~~

Recra LabNet - Lionville

INORGANICS DUPLICATE SPIKE REPORT 12/01/99

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9909L127

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%DIFF
-001	B0WBR8	Chloride by IC	97.1	97.3	0.25
		Fluoride by IC	109.4	109.5	0.11
		Nitrite by IC	103.4	105.2	1.8
		Nitrate by IC	104.3	103.9	0.37
		Phosphate by IC	105.6	105.9	0.25
		Sulfate by IC	100.6	100.5	0.11
-004	B0WBR7	Sulfide	99.0	97.0	2.0
		Nitrate Nitrite	98.6	111.1	11.9
BLANK10	99LN3D47-MB1	Nitrate Nitrite	101.0	102.6	1.6
BLANK10	99LAM038-MB1	Ammonia, as N	97.2	102.0	4.8
BLANK10	99LSDA49-MB1	Sulfide	94.0	95.0	1.1

008

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 12/01/99

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9909L127

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	B0WBR8	Chloride by IC	2.2	2.2	1.0	1.0
		Fluoride by IC	1.4 u	1.4 u	NC	1.0
		Nitrite by IC	1.4 u	1.4 u	NC	1.0
		Nitrate by IC	8.5	8.5	0.46	1.0
		Phosphate by IC	1.4 u	1.4 u	NC	1.0
		Sulfate by IC	40.9	41.3	0.80	1.0
		Ammonia, as N	1.4 u	1.3 u	NC	1.0
-004REP	B0WBR7	% Solids	95.7	96.8	1.2	1.0
		Chromium VI	0.42u	0.42u	NC	1.0
		Nitrate Nitrite	1.5	1.6	7.4	1.0
		pH	9.2	9.2	0.0	1.0
		Sulfide	4.0	1.0 u	NC	1.0
BLANREP	99LICA81-MB1	Sulfate by IC	1.2 u	24.0	NC	1.0

Date: 21 January 2000
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200 Area Source Characterization - 200-CW-1 Operable Unit
Subject: Inorganics - Data Package No. H0534-RLN (SDG No. H0534)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H0534-RLN prepared by Recra LabNet (RLN). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B0WBR0	9/14/99	Soil	C	See note 1
B0WBR1	9/14/99	Soil	C	See note 1
B0WBR2	9/14/99	Soil	C	See note 1
B0WBR4	9/14/99	Soil	C	See note 1
B0WBR5	9/15/99	Soil	C	See note 1
B0WBR6	9/15/99	Soil	C	See note 1
B0WBR7	9/15/99	Soil	C	See note 1
B0WBR8	9/15/99	Soil	C	See note 1

1- ICP metals by 6010B; mercury by 7471A.

Data validation was conducted in accordance with the BHI validation statement of work and the *200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan*, DOE/RL-99-07, Draft B. Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

- **Holding Times**

  Analytical holding times for mercury and ICP metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding

time requirements are as follows: Soil samples must be analyzed within six (6) months for ICP metals and 28 days for mercury.

All holding times were acceptable.

- **Blanks**

Preparation Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations (in ug/L) less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the Contract Required Detection Limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the IDL and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

All preparation blank results were acceptable.

- **Accuracy**

Matrix Spike

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must fall within the range of 70% to 130%. Samples with a spike recovery of less than 25% and a sample result below the IDL are rejected and flagged "UR". Samples with a spike recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a spike recovery greater than 130% and a sample result less than the IDL, no qualification is required.

Due to matrix spike recoveries of 48% and 50%, all antimony results were qualified as estimates and flagged "J".

All other matrix spike recovery results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Laboratory duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Results must be within RPD limits of plus or minus 30% for solid samples. If RPD values are out of specification and the sample concentration is greater than five times the CRDL, all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus two times the CRDL and the sample concentration is less than five times the CRDL, all associated sample results are qualified as estimated and flagged "J/UJ".

All laboratory duplicate results were acceptable.

Field Duplicate Samples

One pair of field duplicate samples (samples B0WBR6/B0WBR7) were submitted to RLN for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. The RPD for chromium was outside QC limits (49%). Under the BHI statement of work, no qualification is required. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific CRDL.

- **Completeness**

Data package No. H0534 was submitted for validation and verified for completeness. The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to matrix spike recoveries of 48% and 50%, all antimony results were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-99-07, Draft B, *200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan*.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H0534	REVIEWER: TLI	DATE: 1/21/00	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Antimony	J	All	MS recovery

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: BECHTEL-HANFORD																	
Laboratory: Recra LabNet																	
Case	SDG: H0534																
Sample Number		B0WBR0		B0WBR1		B0WBR2		B0WBR4		B0WBR5		B0WBR6		B0WBR7		B0WBR8	
Location		B8758		B8758		B8758		B8758		B8758		B8758		B8758		B8758	
Remarks														Duplicate			
Sample Date		09/14/99		09/14/99		09/14/99		09/14/99		09/15/99		09/15/99		09/15/99		09/15/99	
Inorganics	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Silver	2	0.29		0.1	U	0.10	U	0.09	U	0.10	U	0.10	U	0.1	U	0.1	U
Arsenic	1	5.2		4.6		2.0		2.0		1.8		2.5		2.2		2.8	
Barium	1	58.6		79.9		58.7		60.5		60.7		91.5		64.9		100	
Beryllium	0.2	0.13		0.21		0.14		0.11		0.12		0.23		0.17		0.29	
Cadmium	0.04	1.7		0.36		0.09		0.09		0.24		0.28		0.29		0.34	
Chromium	1	8.7		6.2		4.2		10.4		4.9		4.3		6.7		5.1	
Copper	2	11.3		14.0		12.6		11.6		12.1		15.6		14.3		16.6	
Mercury	0.05	0.42		0.18		0.01	U	0.01	U	0.01	U	0.02	U	0.02	U	0.02	U
Nickel	4	7.0		6.9		4.7		7.7		5.3		6.3		6.9		7.3	
Lead	20	43.4		20.8		3.1		2.8		3.7		3.1		4.0		3.1	
Antimony		0.23	UJ	0.25	UJ	0.25	UJ	0.23	UJ	0.25	UJ	0.25	UJ	0.24	UJ	0.24	UJ
Selenium	20	0.34	U	0.37	U	0.37	U	0.34	U	0.38	U	0.37	U	0.36	U	0.35	U
Thallium		0.49	U	0.52	U	0.53	U	0.49	U	0.54	U	0.53	U	0.52	U	0.51	U
Vanadium	3	66.3		53.7		40.5		50.4		52.9		89.7		61.5		91.4	
Zinc	2	48.2		44.8		33.9		37.6		37.2		48.8		44.1		50.2	

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 11/09/99

CLIENT: TMU-HANFORD B99-078 RECRA LOT #: 9909L129

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	BOWER0	Silver, Total	0.29	MG/KG	0.09	1.0
		Arsenic, Total	5.2	MG/KG	0.31	1.0
		Barium, Total	58.6	MG/KG	0.03	1.0
		Beryllium, Total	0.13	MG/KG	0.009	1.0
		Cadmium, Total	1.7	MG/KG	0.03	1.0
		Chromium, Total	8.7	MG/KG	0.07	1.0
		Copper, Total	11.3	MG/KG	0.11	1.0
		Mercury, Total	0.42	MG/KG	0.02	1.0
		Nickel, Total	7.0	MG/KG	0.11	1.0
		Lead, Total	43.4	MG/KG	0.19	1.0
		Antimony, Total	0.23 u	MG/KG	0.23	1.0
		Selenium, Total	0.34 u	MG/KG	0.34	1.0
		Thallium, Total	0.49 u	MG/KG	0.49	1.0
		Vanadium, Total	66.3	MG/KG	0.06	1.0
		Zinc, Total	48.2	MG/KG	0.07	1.0
-002	BOWER1	Silver, Total	0.1 u	MG/KG	0.1	1.0
		Arsenic, Total	4.6	MG/KG	0.33	1.0
		Barium, Total	79.9	MG/KG	0.03	1.0
		Beryllium, Total	0.21	MG/KG	0.01	1.0
		Cadmium, Total	0.36	MG/KG	0.03	1.0
		Chromium, Total	6.2	MG/KG	0.08	1.0
		Copper, Total	14.0	MG/KG	0.12	1.0
		Mercury, Total	0.18	MG/KG	0.02	1.0
		Nickel, Total	6.9	MG/KG	0.12	1.0
		Lead, Total	20.8	MG/KG	0.21	1.0
		Antimony, Total	0.25 u	MG/KG	0.25	1.0
		Selenium, Total	0.37 u	MG/KG	0.37	1.0
		Thallium, Total	0.52 u	MG/KG	0.52	1.0
		Vanadium, Total	53.7	MG/KG	0.06	1.0
		Zinc, Total	44.8	MG/KG	0.08	1.0

1/14/00

DAS

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 11/09/99

CLIENT: TWU-HANFORD B99-078 RECRA LOT #: 9909L129

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-003	BOWBR2	Silver, Total	0.10 u	MG/KG	0.10	1.0
		Arsenic, Total	2.0	MG/KG	0.33	1.0
		Barium, Total	58.7	MG/KG	0.03	1.0
		Beryllium, Total	0.14	MG/KG	0.01	1.0
		Cadmium, Total	0.09	MG/KG	0.03	1.0
		Chromium, Total	4.2	MG/KG	0.08	1.0
		Copper, Total	12.6	MG/KG	0.12	1.0
		Mercury, Total	0.01 u	MG/KG	0.01	1.0
		Nickel, Total	4.7	MG/KG	0.12	1.0
		Lead, Total	3.1	MG/KG	0.21	1.0
		Antimony, Total	0.25 u	MG/KG	0.25	1.0
		Selenium, Total	0.37 u	MG/KG	0.37	1.0
		Thallium, Total	0.53 u	MG/KG	0.53	1.0
		Vanadium, Total	40.5	MG/KG	0.06	1.0
		Zinc, Total	33.9	MG/KG	0.08	1.0
-004	BOWBR4	Silver, Total	0.09 u	MG/KG	0.09	1.0
		Arsenic, Total	2.0	MG/KG	0.30	1.0
		Barium, Total	60.5	MG/KG	0.03	1.0
		Beryllium, Total	0.11	MG/KG	0.009	1.0
		Cadmium, Total	0.09	MG/KG	0.03	1.0
		Chromium, Total	10.4	MG/KG	0.07	1.0
		Copper, Total	11.6	MG/KG	0.11	1.0
		Mercury, Total	0.01 u	MG/KG	0.01	1.0
		Nickel, Total	7.7	MG/KG	0.11	1.0
		Lead, Total	2.8	MG/KG	0.19	1.0
		Antimony, Total	0.23 u	MG/KG	0.23	1.0
		Selenium, Total	0.34 u	MG/KG	0.34	1.0
		Thallium, Total	0.49 u	MG/KG	0.49	1.0
		Vanadium, Total	50.4	MG/KG	0.06	1.0
		Zinc, Total	37.6	MG/KG	0.07	1.0

K
1/14/00

AAC

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 11/09/99

CLIENT: TMU-HANFORD B99-078 RECRA LOT #: 9909L127

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-003	B0WBR6	Silver, Total	0.10 u	MG/KG	0.10	1.0
		Arsenic, Total	2.5	MG/KG	0.33	1.0
		Barium, Total	91.5	MG/KG	0.03	1.0
		Beryllium, Total	0.23	MG/KG	0.01	1.0
		Cadmium, Total	0.28	MG/KG	0.03	1.0
		Chromium, Total	4.3	MG/KG	0.08	1.0
		Copper, Total	15.6	MG/KG	0.12	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Nickel, Total	6.3	MG/KG	0.12	1.0
		Lead, Total	3.1	MG/KG	0.21	1.0
		Antimony, Total	0.25 uJ	MG/KG	0.25	1.0
		Selenium, Total	0.37 u	MG/KG	0.37	1.0
		Thallium, Total	0.53 u	MG/KG	0.53	1.0
		Vanadium, Total	89.7	MG/KG	0.06	1.0
		Zinc, Total	48.8	MG/KG	0.08	1.0
-004	B0WBR7	Silver, Total	0.1 u	MG/KG	0.1	1.0
		Arsenic, Total	2.2	MG/KG	0.32	1.0
		Barium, Total	64.9	MG/KG	0.03	1.0
		Beryllium, Total	0.17	MG/KG	0.01	1.0
		Cadmium, Total	0.29	MG/KG	0.03	1.0
		Chromium, Total	6.7	MG/KG	0.08	1.0
		Copper, Total	14.3	MG/KG	0.12	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Nickel, Total	6.9	MG/KG	0.12	1.0
		Lead, Total	4.0	MG/KG	0.21	1.0
		Antimony, Total	0.24 uJ	MG/KG	0.24	1.0
		Selenium, Total	0.36 u	MG/KG	0.36	1.0
		Thallium, Total	0.52 u	MG/KG	0.52	1.0
		Vanadium, Total	61.5	MG/KG	0.06	1.0
		Zinc, Total	44.1	MG/KG	0.08	1.0

1/10/00

OOOB

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 11/09/99

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9909L127

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	BOWER8	Silver, Total	0.1 u	MG/KG	0.1	1.0
		Arsenic, Total	2.8	MG/KG	0.32	1.0
		Barium, Total	100	MG/KG	0.03	1.0
		Beryllium, Total	0.29	MG/KG	0.01	1.0
		Cadmium, Total	0.34	MG/KG	0.03	1.0
		Chromium, Total	5.1	MG/KG	0.08	1.0
		Copper, Total	15.6	MG/KG	0.11	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Nickel, Total	7.3	MG/KG	0.11	1.0
		Lead, Total	3.1	MG/KG	0.20	1.0
		Antimony, Total	0.24 uJ	MG/KG	0.24	1.0
		Selenium, Total	0.35 u	MG/KG	0.35	1.0
		Thallium, Total	0.51 u	MG/KG	0.51	1.0
		Vanadium, Total	91.4	MG/KG	0.06	1.0
		Zinc, Total	50.2	MG/KG	0.08	1.0
-002	BOWER5	Silver, Total	0.10 u	MG/KG	0.10	1.0
		Arsenic, Total	1.8	MG/KG	0.34	1.0
		Barium, Total	60.7	MG/KG	0.03	1.0
		Beryllium, Total	0.12	MG/KG	0.01	1.0
		Cadmium, Total	0.24	MG/KG	0.03	1.0
		Chromium, Total	4.9	MG/KG	0.08	1.0
		Copper, Total	12.1	MG/KG	0.12	1.0
		Mercury, Total	0.01 u	MG/KG	0.01	1.0
		Nickel, Total	5.3	MG/KG	0.12	1.0
		Lead, Total	3.7	MG/KG	0.21	1.0
		Antimony, Total	0.25 uJ	MG/KG	0.25	1.0
		Selenium, Total	0.38 u	MG/KG	0.38	1.0
		Thallium, Total	0.54 u	MG/KG	0.54	1.0
		Vanadium, Total	52.9	MG/KG	0.06	1.0
		Zinc, Total	37.2	MG/KG	0.08	1.0

11/10/00

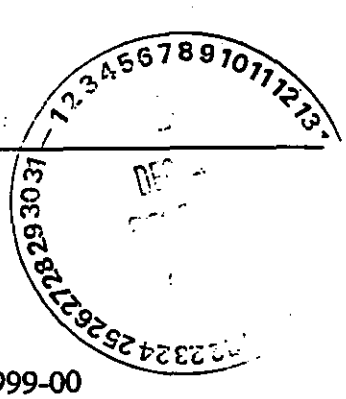
005

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Measurement Information



Recra LabNet Philadelphia
Analytical Report

Client : TNU-HANFORD B99-078
RFW# : 9909L127
SDG/SAF# : H0534/B99-078

W.O.# : 10985-001-001-9999-00
Date Received: 09-17-99

REVISION

METALS CASE NARRATIVE

This package has been revised to include the addition of Antimony and Thallium.

1. This narrative covers the analyses of 4 soil samples.

2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary.

3. All analyses were performed within the required holding times.

4. The cooler temperature has been recorded on the Chain of Custody.

5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury).

6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).

7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL) or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.

8. All ICP Interference Check Standards were within control limits.

9. All laboratory control samples (LCS) were within the laboratory control limits. Refer to the Inorganics Laboratory Control Standards Report.

10. The matrix spike (MS) recovery for 1 analyte was outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.

208 Welsh Pool Road • Lionville, PA 19341-1333 • (610) 280-3000 • Fax (610) 280-3041

11. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution are performed. A PDS was prepared at the following concentration:

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
B0WBR8	Antimony	200	94.8

12. All duplicate analyses were within the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

13. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.

Pat Ec

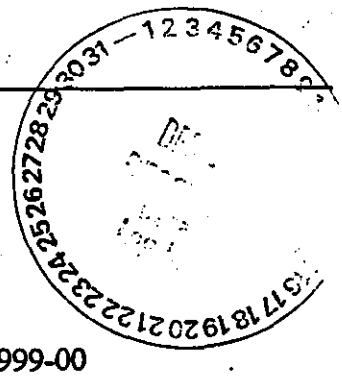
J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

11-11-94
Date

mld/m09-127r

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Measurement Information



Recra LabNet Philadelphia
Analytical Report

Client : TNU-HANFORD B99-078
RFW# : 9909L129
SDG/SAF# : H0534/B99-078

W.O.# : 10985-001-001-9999-00
Date Received: 09-17-99

REVISION

METALS CASE NARRATIVE

This package has been revised to include the addition of Antimony and Thallium.

1. This narrative covers the analyses of 4 soil samples.

2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary.

3. All analyses were performed within the required holding times.

4. The cooler temperature has been recorded on the Chain of Custody.

5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury).

6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).

7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL) or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.

8. All ICP Interference Check Standards were within control limits.

9. All laboratory control samples (LCS) were within the laboratory control limits. Refer to the Inorganics Laboratory Control Standards Report.

10. The matrix spike (MS) recoveries for 2 analytes were outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.

208 Welsh Pool Road • Lionville, PA 19341-1333 • (610) 280-3000 • Fax (610) 280-3041

11. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution are performed. A PDS was prepared at the following concentration:

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
B0WBR0	Lead	200	96.8
	Antimony	200	96.8

12. The duplicate analysis for 1 analyte was outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

13. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.

Pat Ea

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

11-11-99
Date

mld/m10-129r

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-119	Page 1 of 1

Collector Bowers/Trice	Company Contact Chris Cearlock	Telephone No. 372-9574	Project Coordinator TRENT, SJ
Project Designation 200 Area Source characterization - 200-CW-1 OU	Sampling Location 200 Bpond (B8758) <15'		SAF No. B99-078
Ice Chest No. ERC 96 065	Field Logbook No. EL-1511		Method of Shipment Fed Ex
Shipped To ~~TMA~~/RECRA DTA 9-14-99	Offsite Property No. A990257		Bill of Lading/Air Bill No. 4235 7952 9550
			COA B20CW1 671C

Price Code 8N

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	None	Cool 4C						
Type of Container	aG	aG	aG	aG						
No. of Container(s)	1	1	1	1						
Volume	60mL	250mL	250mL	500mL						
SAMPLE ANALYSIS	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.						

Sample No.	Matrix *	Sample Date	Sample Time										
B0WBR0	Soil	9.14.99	1216	X	X		X		B0WCR0				
B0WBR1	Soil	9.14.99	1300	X	X		X		B0WCR0				
B0WBR2	Soil	9.14.99	1340	X	X		X		B0WCR0				
~~B0WBR3~~ 9.14.99 CT	Soil												
B0WBR4	Soil	9.14.99	1510	X	X		X		B0WCR0				

CHAIN OF POSSESSION	Sign/Print Names			
Relinquished By Doug Bowers / [signature]	Date/Time 9-17-99/1700	Received By R F IB	Date/Time 9-17-99/1700
Relinquished By Refer IB	Date/Time 9/16/99 11:30	Received By Brent Porter	Date/Time 9/16/99 11:30
Relinquished By Brent Porter	Date/Time 9/16/99 11:30	Received By Fed Express	Date/Time 9/16/99 11:30
Relinquished By [signature]	Date/Time 9-17-99 0245	Received By Vicki Henry	Date/Time 9-17-99 0245

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078. Out of Gamma Spec. bottle also analyze for Np-237, isotopic U, . Out of ICP bottle also analyze for NO2/NO3, IC anions, Sulfides, Ammonia, Total Cyanide, and pH.

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 -- Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241
(2) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Beryllium, Copper, Nickel, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

Collector unavailable to sign COC

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

0000280

0116

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-121	Page 1 of 1

Collector: Bowers/Trice	Company Contact: Chris Cearlock — Telephone No.: 372-9574	Project Coordinator: TRENT, SJ	Price Code: 8N — Data Turnaround: 45 Days
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: 200 B pond (B8758) >15'	SAF No.: B99-078	
Ice Chest No.: ERC 96 024	Field Logbook No.: EL-1511	Method of Shipment: Fed Ex	
Shipped To: TMA/RECRA	Offsite Property No.: A990259	Bill of Lading/Air Bill No.: 423579529561	
SAB 9-15-99		COA: B20CW167K	

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	Cool 4C	Cool 4C	None	Cool 4C						
	Type of Container	sG	sG	sG	sG						
	No. of Container(s)	1	1	1	1						
Special Handling and/or Storage	Volume	60mL	250mL	250mL	500mL						
SAMPLE ANALYSIS		VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.						

Sample No.	Matrix *	Sample Date	Sample Time								
B0WBR8	Soil	9.15.99	0945	X	X		X			BOWCA1	
B0WBR9	Soil		9/15/99								
B0WBT0	Soil		9/15/99								
B0WBT1	Soil		CT 9/15/99								

0000231

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: [signature]	Date/Time: 9/15/99 1530	Received By: [signature]	Date/Time: 9/15/99 1530
Relinquished By: REF 1B	Date/Time: 9/16/99 1300	Received By: SIGALE	Date/Time: 9/16/99 1300
Relinquished By: SIGALE	Date/Time: 9/16/99 1300	Received By: FED EX	Date/Time:
Relinquished By: FED EX	Date/Time: 9-17-99 1020	Received By: TMurray	Date/Time: 9-17-99 1020
		Title:	

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078. Out of Gamma Spec. bottle also analyze for Np-237, isotopic U, Ni-63, Tech-99, Tritium, . Out of ICP bottle also analyze for NO2/NO3, IC anions, Sulfides, Ammonia, Total Cyanide, and pH.

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 -- Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241

(2) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Beryllium, Copper, Nickel, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

COLLECTOR UNAVAILABLE TO SIGN COC

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

LABORATORY SECTION	Received By	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By / Date/Time

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-078-120

Page 1 of 1

Collector Bowers/Trice	**Company Contact** Chris Cearlock	**Telephone No.** 372-9574	**Project Coordinator** TRENT, SJ
Price Code 8N	**Data Turnaround** 45 Days		
Project Designation 200 Area Source characterization - 200-CW-1 OU	**Sampling Location** 200 Bpond (B8758) <15'		**SAF No.** B99-078
Ice Chest No. ERC 96 024	**Field Logbook No.** EL-1511		**Method of Shipment** Fed Ex
Shipped To TMA/RECRA D 3B 9-15-99	**Offsite Property No.** A990259		**Bill of Lading/Air Bill No.** 423579529561
			COA B20CW167C

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	None	Cool 4C	None						
Type of Container	aG	aG	aG	aG	p						
No. of Container(s)	1	1	1	1	1						
Volume	60mL	250mL	250mL	500mL	plastic bag						
SAMPLE ANALYSIS	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.	Particle size						

Sample No.	Matrix *	Sample Date	Sample Time								
~~B0WBR4~~ DUP 9-15-99	Soil	9-15-99									
B0WBR5	Soil	9-15-99	0739	X	X		X			Rouc R1	
B0WBR6	Soil	9-15-99	0834	X	X		X	X 9/16/99		Rouc R1	
B0WBR7	Soil	9-15-99	0834	X	X		X			Rouc R1	

CHAIN OF POSSESSION

Relinquished By	Date/Time	Received By	Date/Time
C Bowers	9/15/99 1530	Ref IB	9/15/99 1530
Ref IB	9/16/99 1300	D Owens	9/16/99 1300
D Owens	9/16/99 1300	FED EX	
FedEx	9-17-99 1020	T Murray	9-17-99 1020

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078. Out of Gamma Spec. bottle also analyze for Np-237, isotopic U, . Out of ICP bottle also analyze for NO2/NO3, IC anions, Sulfides, Ammonia, Total Cyanide, and pH.

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 -- Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241
(2) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Beryllium, Copper, Nickel, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

COLLECTOR UNAVAILABLE TO SIGN COC

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200-CW-1			DATA PACKAGE: H0534		
VALIDATOR: TLI		LAB: Recra		DATE: 12/20/94	
CASE:			SDG: H0534		

ANALYSES PERFORMED

☐ CLP/ICP	☐ CLP/GFAA	☐ CLP/Hg	☐ CLP/Cyanide	☐	☐
☒ SW-846/ICP	☐ SW-846/GFAA	☒ SW-846/Hg	☐ SW-846 Cyanide	☐	☐

SAMPLES/MATRIX BOWBR0 BOWBR1 BOWBR2 BOWBR4
BOWBR5 BOWBR6 BOWBR7 BOWBR8

soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . Yes No (N/A)

Is a case narrative present? . . . . . (Yes) No N/A

Comments: _____

2. HOLDING TIMES

Are sample holding times acceptable? . . . . . (Yes) No N/A

Comments: _____

A-192

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

Were initial calibrations performed on all instruments?	Yes	No	N/A
Are initial calibrations acceptable?	Yes	No	N/A
Are ICP interference checks acceptable?	Yes	No	N/A
Were ICV and CCV checks performed on all instruments?	Yes	No	N/A
Are ICV and CCV checks acceptable?	Yes	No	N/A

Comments:

4. BLANKS

Were ICB and CCB checks performed for all applicable analyses?	Yes	No	N/A
Are ICB and CCB results acceptable?	Yes	No	N/A
Were preparation blanks analyzed?	Yes	No	N/A
Are preparation blank results acceptable?	Yes	No	N/A
Were field/trip blanks analyzed?	~~Yes~~	No	N/A
Are field/trip blank results acceptable?	Yes	~~No~~	N/A

Comments: BRL/BR7 ER - 4950 2

5. ACCURACY

Were spike samples analyzed?	Yes	No	N/A
Are spike sample recoveries acceptable?	Yes	No	N/A
Were laboratory control samples (LCS) analyzed?	Yes	No	N/A
Are LCS recoveries acceptable?	Yes	No	N/A

Comments: Antimony - J 5,6,7,8 48% rec

" 4 0,1,2,4 50% rec

Lead J 0,1,2,4 44% rec

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

6. PRECISION

Were laboratory duplicates analyzed?	Yes	No	N/A
Are laboratory duplicate samples RPD values acceptable?	Yes	No	N/A
Were ICP serial dilution samples analyzed?	Yes	No	N/A
Are ICP serial dilution %D values acceptable?	Yes	No	N/A
Are field duplicate RPD values acceptable?	Yes	No	N/A
Are field split RPD values acceptable?	Yes	No	N/A

Comments: CR - 4990

7. FURNACE AA QUALITY CONTROL

Were duplicate injections performed as required?	Yes	No	N/A
Are duplicate injection %RSD values acceptable?	Yes	No	N/A
Were analytical spikes performed as required?	Yes	No	N/A
Are analytical spike recoveries acceptable?	Yes	No	N/A
Was MSA performed as required?	Yes	No	N/A
Are MSA results acceptable?	Yes	No	N/A

Comments:

8. REPORTED RESULTS AND DETECTION LIMITS

Are results reported for all requested analyses?	Yes	No	N/A
Are all results supported in the raw data?	Yes	No	N/A
Are results calculated properly?	Yes	No	N/A
Do results meet the CRDLs?	Yes	No	N/A

Comments:

A-2

Roora LabNet - Lionville

INORGANICS ACCURACY REPORT 11/09/99

CLIENT: TNU-HANFORD B99-078 RECRA LOT #: 9909L129

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	BOWBRO	Silver, Total	5.3	0.29	5.4	92.8	1.0
		Arsenic, Total	204	5.2	214	92.7	1.0
		Barium, Total	260	58.6	214	94.0	1.0
		Beryllium, Total	5.1	0.13	5.4	92.0	1.0
		Cadmium, Total	6.3	1.7	5.4	85.2	1.0
		Chromium, Total	29.9	8.7	21.4	99.1	1.0
		Copper, Total	36.1	11.3	26.8	92.5	1.0
		Mercury, Total	0.62	0.42	0.17	119.1	1.0
		Nickel, Total	56.2	7.0	53.6	91.8	1.0
		Lead, Total	83.3	43.4	53.6	74.4	1.0
		Antimony, Total	26.6	0.23u	53.6	49.6	1.0
		Selenium, Total	195	0.34u	214	91.0	1.0
		Thallium, Total	202	0.49u	214	94.0	1.0
		Vanadium, Total	111	66.3	53.6	83.5	1.0
		Zinc, Total	93.3	48.2	53.6	84.2	1.0

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 11/09/99

CLIENT: TMU-HANFORD B99-078 RECRA LOT #: 9909L127

WORK ORDER: 10985-001-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	BOWER8	Silver, Total	4.7	0.1 u	5.1	92.2	1.0
		Arsenic, Total	190	2.8	204	91.7	1.0
		Barium, Total	313	100	204	104.3	1.0
		Beryllium, Total	5.0	0.29	5.1	92.3	1.0
		Cadmium, Total	5.0	0.34	5.1	91.3	1.0
		Chromium, Total	25.1	5.1	20.4	98.0	1.0
		Copper, Total	40.8	16.6	25.5	95.2	1.0
		Mercury, Total	0.19	0.02u	0.18	105.6	1.0
		Nickel, Total	53.3	7.3	50.9	90.4	1.0
		Lead, Total	49.7	3.1	51.0	91.4	1.0
		Antimony, Total	24.3	0.24u	50.9	47.7	1.0
		Selenium, Total	182	0.35u	204	89.2	1.0
		Thallium, Total	188	0.51u	204	92.3	1.0
		Vanadium, Total	149	91.4	50.9	112.6	1.0
		Zinc, Total	99.6	50.2	51.0	96.9	1.0

008

Date: 21 January 2000
To: Bechtel Hanford, Inc. (technical representative)
From: TechLaw, Inc.
Project: 200 Area Source Characterization - 200-CW-1 Operable Unit
Subject: Radiochemistry - Data Package No. H0534-TNU (SDG No. H0534)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0534-TNU which was prepared by Thermo NUtech (TNU). A list of samples validated along with the analyses reported and the requested analytes is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B0WBR0	9/14/99	Soil	C	See note 1
B0WBR1	9/14/99	Soil	C	See note 1
B0WBR2	9/14/99	Soil	C	See note 1
B0WBR4	9/14/99	Soil	C	See note 1
B0WBR5	9/15/99	Soil	C	See note 1 & 2
B0WBR6	9/15/99	Soil	C	See note 1 & 2
B0WBR7	9/15/99	Soil	C	See note 1 & 2
B0WBR8	9/15/99	Soil	C	See note 1 & 2

1 - Strontium-90; alpha spectroscopy (isotopic plutonium, isotopic thorium and americium-241); neptunium-237; gamma spectroscopy; total uranium.
2 - Tritium; nickel-63; technetium-99

Data validation was conducted in accordance with the BHI validation statement of work and the *200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan*, DOE/RL-99-07, Draft B. Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

- **Holding Times**

  Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months with analysis within 7 days of distillation for liquid scintillation counting.

  All holding times were acceptable.

- **Blanks**

  Laboratory Blanks

  Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the RDL, the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the MDA are qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

  Due to the laboratory blank not being analyzed with the SDG, all thorium-228, thorium-230 and thorium-232 alpha spectroscopy results in all samples were qualified as estimates and flagged "J".

  All other laboratory blank results were acceptable.

- **Accuracy**

  Accuracy is evaluated by analyzing distilled water or field samples spiked with known amounts of radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable laboratory control sample and matrix spike recovery range is 70-130% (80-120% for gamma spectroscopy). In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable

range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, rejected, or not qualified, depending on the activity of the individual sample.

Due to the lack of a matrix spike analysis, all tritium results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

- **Precision**

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. Precision may also be assessed using unspiked duplicate sample analyses. If both sample and replicate activities are greater than five times the CRDL and the RPD is less than 30 percent, the results are acceptable. If either activities are less then five times the CRDL, a control limit of less than or equal to two times the CRDL is used. If either the original or replicate value is below the CRDL, the applicable control limit is two times the CRDL for soil samples. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All duplicate results were acceptable.

Field Duplicate Samples

One pair of field duplicate samples (samples B0WBR6/B0WBR7) were submitted to TNU for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All other duplicate results were acceptable.

- **Detection Levels**

Reported analytical detection levels are compared against contract required MDAs to ensure that laboratory detection levels meet the required criteria. The reported detection limit exceeded the contract required MDA for the following: Europium-155 in sample B0WBR1. Under the BHI statement of work, no

qualification is required. All other reported laboratory detection levels met the analyte specific MDA.

- **Completeness**

  Data Package No. H0534 (SDG No. H0534) was submitted for validation and verified for completeness. The completion rate was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to the laboratory blank not being analyzed with the SDG, all thorium-228, thorium-230 and thorium-232 alpha spectroscopy results in all samples were qualified as estimates and flagged "J". Due to the lack of a matrix spike analysis, all tritium results were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

The reported detection limit exceeded the contract required MDA for the following: Europium-155 in sample B0WBR1. Under the BHI statement of work, no qualification is required.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-99-07, Draft B, *200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan.*

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI statement of work are as follows:

U - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.

UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.

J - Indicates the compound or analyte was analyzed for and detected. Due to a QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H0534	REVIEWER: TLI	DATE: 1/21/00	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Thorium-228 (aspec) Thorium-230 (aspec) Thorium-232 (aspec)	J	All	Blank not run w/SDG
Tritium	J	All	No MS analyzed

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX, (PCi/G) Page 1 of 1

Project: BECHTEL-HANFORD																	
Laboratory: TNU																	
Case	SDG: H0534																
Sample Number		B0WBR0		B0WBR1		B0WBR2		B0WBR4		B0WBR5		B0WBR6		B0WBR7		B0WBR8	
Location		B8758		B8758		B8758		B8758		B8758		B8758		B8758		B8758	
Remarks														Duplicate			
Sample Date		09/14/99		09/14/99		09/14/99		09/14/99		09/15/99		09/15/99		09/15/99		09/15/99	
Radiochemistry	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Tritium	400	NA		NA		NA		NA		-0.033	UJ	0.005	UJ	0	UJ	0.004	UJ
Technetium-99	15	NA		NA		NA		NA		-0.026	U	-0.107	U	-0.017	U	-0.024	U
Neptunium-237	1	0.003	U	0.003	U	0	U	0.004	U	0.005	U	-0.007	U	0	U	0	U
Total Uranium*	1	0.532		0.464		0.419		0.181		0.314		0.480		0.439		0.663	
Plutonium-238	1	0	U	0	U	-0.009	U	0	U	0.010	U	0.005	U	0	U	0	U
Plutonium-239/240	1	0.969		0.224		0.030	U	0.033		0	U	0	U	-0.036	U	0.005	U
Nickel-63	30	NA		NA		NA		NA		0.292	U	-0.909	U	-1.14	U	-0.865	U
Americium-241	1	0.073	U	0	U	0.005	U	-0.018	U	0.012	U	-0.008	U	0.013	U	0	U
Total Strontium	1	0.827		3.88		18.1		21.8		24.8		19.7		17.2		46.9	
Thorium-228		0.808	J	0.699	J	0.421	J	0.468	J	0.392	J	0.306	J	0.423	J	0.502	J
Thorium-230		0.840	J	1.13	J	0.491	J	0.574	J	0.729	J	0.596	J	0.773	J	0.658	J
Thorium-232	1	0.791	J	0.562	J	0.358	J	0.429	J	0.337	J	0.336	J	0.234	J	0.407	J
Potassium-40		11.5		9.88		8.66		8.11		9.23		8.82		8.56		9.02	
Cobalt 60	0.1	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Cesium 137	0.1	7.47		2.20		U	U	U	U	U	U	U	U	U	U	U	U
Europium 152	0.2	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Europium 154	0.2	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Europium 155	0.1	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Radium-226		0.568		0.463		0.276		0.302		0.314		0.356		0.263		0.328	
Radium-228		1.02		0.619		0.466		0.468		0.469		0.447		0.478		0.580	
Thorium-228		0.678		0.526		0.406		0.372		0.520		0.387		0.390		0.487	
Thorium-232		1.02		0.619		0.466		0.468		0.469		0.447		0.478		0.580	
Americium-241 (gea)		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Uranium-238 (gea)		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Uranium-235 (gea)		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
* - Units are mg/kg																	

0000011

TMA / RICHMOND

SAMPLE DELIVERY GROUP H0534

N909117-01 B0WBR0

DATA SHEET

SDG	7212	Client/Case no	Hanford SDG H0534
Contact	Kevin C. Johnson	Contract	TRB-SBB-207925
Lab sample id	N909117-01	Client sample id	B0WBR0
Dept sample id	7212-001	Location/Matrix	200 Bpond (B8758)<15' SOLID
Received	09/17/99	Collected	09/14/99 12:16
% solids	91.9	Custody/SAF No	B99-078-119 B99-078

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Neptunium 237	13994-20-2	0.003	0.012	0.030		U	NP
Total Uranium (ug/g)	7440-61-1	0.532	0.061	0.005	1.0		U_T
Plutonium 238	13981-16-3	0	0.017	0.048	1.0	U	PU
Plutonium 239/240	PU-239/240	0.969	0.15	0.054	1.0		PU
Americium 241	14596-10-2	0.073	0.073	0.10	1.0	U	AM
Total Strontium	SR-RAD	0.827	0.16	0.18	1.0		SR
Thorium 228	14274-82-9	0.808	0.18	0.12	1.0	J	TH
Thorium 230	14269-63-7	0.840	0.20	0.14	1.0	J	TH
Thorium 232	TH-232	0.791	0.17	0.062	1.0	J	TH
Potassium 40	13966-00-2	11.5	1.0	0.65			GAM
Cobalt 60	10198-40-0	U		0.055	0.050	U	GAM
Cesium 137	10045-97-3	7.47	0.15	0.064	0.10		GAM
Europium 152	14683-23-9	U		0.17	0.10	U	GAM
Europium 154	15585-10-1	U		0.19	0.10	U	GAM
Europium 155	14391-16-3	U		0.097	0.10	U	GAM
Radium 226	13982-63-3	0.568	0.11	0.11	0.10		GAM
Radium 228	15262-20-1	1.02	0.25	0.21	0.20		GAM
Thorium 228	14274-82-9	0.678	0.067	0.079			GAM
Thorium 232	TH-232	1.02	0.25	0.21			GAM
Americium 241	14596-10-2	U		0.067		U	GAM
Uranium 238	U-238	U		6.6		U	GAM
Uranium 235	15117-96-1	U		0.18		U	GAM

200 Area Source chrctztn-200-CW-1 OU

2/11/00

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	11/18/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0534

N909117-02 B0WBR1

DATA SHEET

SDG 7212 Client/Case no Hanford SDG H0534
Contact Kevin C. Johnson Contract TRB-SBB-207925

Lab sample id N909117-02 Client sample id B0WBR1
Dept sample id 7212-002 Location/Matrix 200 Bpond (B8758)<15' SOLID
Received 09/17/99 Collected 09/14/99 13:00
% solids 93.7 Custody/SAF No B99-078-119 B99-078

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Neptunium 237	13994-20-2	0.003	0.023	0.042		U	NP
Total Uranium (ug/g)	7440-61-1	0.464	0.053	0.005	1.0	~~U~~	U_T
Plutonium 238	13981-16-3	0	0.017	0.047	1.0	U	PU
Plutonium 239/240	PU-239/240	0.224	0.069	0.047	1.0	~~U~~	PU
Americium 241	14596-10-2	0	0.038	0.091	1.0	U	AM
Total Strontium	SR-RAD	3.88	0.27	0.18	1.0		SR
Thorium 228	14274-82-9	0.699	0.16	0.12	1.0	~~U~~ J	TH
Thorium 230	14269-63-7	1.13	0.21	0.15	1.0	~~U~~ J	TH
Thorium 232	TH-232	0.562	0.15	0.061	1.0	~~U~~ J	TH
Potassium 40	13966-00-2	9.88	0.86	0.52			GAM
Cobalt 60	10198-40-0	U		0.044	0.050	U	GAM
Cesium 137	10045-97-3	2.20	0.086	0.059	0.10		GAM
Europium 152	14683-23-9	U		0.12	0.10	U	GAM
Europium 154	15585-10-1	U		0.13	0.10	U	GAM
Europium 155	14391-16-3	U		0.11	0.10	U	GAM
Radium 226	13982-63-3	0.463	0.094	0.10	0.10		GAM
Radium 228	15262-20-1	0.619	0.17	0.17	0.20		GAM
Thorium 228	14274-82-9	0.526	0.056	0.055			GAM
Thorium 232	TH-232	0.619	0.17	0.17			GAM
Americium 241	14596-10-2	U		0.11		U	GAM
Uranium 238	U-238	U		4.7		U	GAM
Uranium 235	15117-96-1	U		0.16		U	GAM

200 Area Source chrctztn-200-CW-1 OU

2/10/00

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 11/18/99

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SAMPLE DELIVERY GROUP H0534

N909117-03 B0WBR2

DATA SHEET

SDG 7212 Client/Case no Hanford SDG H0534
Contact Kevin C. Johnson Contract TRB-SBB-207925

Lab sample id N909117-03 Client sample id B0WBR2
Dept sample id 7212-003 Location/Matrix 200 Bpond (B8758)<15' SOLID
Received 09/17/99 Collected 09/14/99 13:40
% solids 97.3 Custody/SAF No B99-078-119 B99-078

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Neptunium 237	13994-20-2	0	0.020	0.077		U	NP
Total Uranium (ug/g)	7440-61-1	0.419	0.048	0.005	1.0	~~U~~	U_T
Plutonium 238	13981-16-3	-0.009	0.017	0.052	1.0	U	PU
Plutonium 239/240	PU-239/240	0.030	0.034	0.052	1.0	U	PU
Americium 241	14596-10-2	0.005	0.029	0.053	1.0	U	AM
Total Strontium	SR-RAD	18.1	0.45	0.16	1.0		SR
Thorium 228	14274-82-9	0.421	0.13	0.13	1.0	~~U~~ J	TH
Thorium 230	14269-63-7	0.491	0.16	0.14	1.0	~~UB~~ J	TH
Thorium 232	TH-232	0.358	0.11	0.096	1.0	~~U~~ J	TH
Potassium 40	13966-00-2	8.66	0.41	0.20			GAM
Cobalt 60	10198-40-0	U		0.020	0.050	U	GAM
Cesium 137	10045-97-3	U		0.023	0.10	U	GAM
Europium 152	14683-23-9	U		0.051	0.10	U	GAM
Europium 154	15585-10-1	U		0.066	0.10	U	GAM
Europium 155	14391-16-3	U		0.052	0.10	U	GAM
Radium 226	13982-63-3	0.276	0.044	0.042	0.10		GAM
Radium 228	15262-20-1	0.466	0.10	0.093	0.20		GAM
Thorium 228	14274-82-9	0.406	0.026	0.025			GAM
Thorium 232	TH-232	0.466	0.10	0.093			GAM
Americium 241	14596-10-2	U		0.054		U	GAM
Uranium 238	U-238	U		2.6		U	GAM
Uranium 235	15117-96-1	U		0.088		U	GAM

200 Area Source chrctztn-200-CW-1 OU

2/11/00

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 11/18/99

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SAMPLE DELIVERY GROUP H0534

N909117-04 B0WBR4

DATA SHEET

SDG	7212	Client/Case no	Hanford SDG H0534
Contact	Kevin C. Johnson	Contract	TRB-SBB-207925
Lab sample id	N909117-04	Client sample id	B0WBR4
Dept sample id	7212-004	Location/Matrix	200 Bpond (B8758)<15' SOLID
Received	09/17/99	Collected	09/14/99 15:10
% solids	97.5	Custody/SAF No	B99-078-119 B99-078

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Neptunium 237	13994-20-2	0.004	0.023	0.047		U	NP
Total Uranium (ug/g)	7440-61-1	0.181	0.021	0.005	1.0	~~U~~	U_T
Plutonium 238	13981-16-3	0	0.008	0.031	1.0	U	PU
Plutonium 239/240	PU-239/240	0.033	0.025	0.031	1.0	~~U~~	PU
Americium 241	14596-10-2	-0.018	0.027	0.060	1.0	U	AM
Total Strontium	SR-RAD	21.8	0.48	0.15	1.0		SR
Thorium 228	14274-82-9	0.468	0.15	0.17	1.0	~~U~~ J	TH
Thorium 230	14269-63-7	0.574	0.17	0.18	1.0	~~U~~B J	TH
Thorium 232	TH-232	0.429	0.12	0.059	1.0	~~U~~ J	TH
Potassium 40	13966-00-2	8.11	0.47	0.26			GAM
Cobalt 60	10198-40-0	U		0.024	0.050	U	GAM
Cesium 137	10045-97-3	U		0.023	0.10	U	GAM
Europium 152	14683-23-9	U		0.058	0.10	U	GAM
Europium 154	15585-10-1	U		0.080	0.10	U	GAM
Europium 155	14391-16-3	U		0.064	0.10	U	GAM
Radium 226	13982-63-3	0.302	0.048	0.046	0.10		GAM
Radium 228	15262-20-1	0.468	0.11	0.098	0.20		GAM
Thorium 228	14274-82-9	0.372	0.029	0.029			GAM
Thorium 232	TH-232	0.468	0.11	0.098			GAM
Americium 241	14596-10-2	U		0.066		U	GAM
Uranium 238	U-238	U		2.9		U	GAM
Uranium 235	15117-96-1	U		0.095		U	GAM

200 Area Source chrctztn-200-CW-1 OU

2/11/00

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	11/18/99

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SAMPLE DELIVERY GROUP H0534

N909117-05 B0WBR5

DATA SHEET

SDG 7212 Client/Case no Hanford SDG H0534
Contact Kevin C. Johnson Contract TRB-SBB-207925

Lab sample id N909117-05 Client sample id B0WBR5
Dept sample id 7212-005 Location/Matrix 200 Bpond (B8758)>15' SOLID
Received 09/17/99 Collected 09/15/99 07:39
% solids 97.2 Custody/SAF No B99-078-120 B99-078

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	-0.033	0.047	0.082	400	U J	H
Technetium 99	14133-76-7	-0.026	0.16	0.47	15	U	TC
Neptunium 237	13994-20-2	0.005	0.019	0.046		U	NP
Total Uranium (ug/g)	7440-61-1	0.314	0.036	0.005	1.0		U_T
Plutonium 238	13981-16-3	0.010	0.019	0.046	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.019	0.053	1.0	U	PU
Nickel 63	13981-37-8	0.292	1.6	2.6	30	U	NI_L
Americium 241	14596-10-2	0.012	0.023	0.043	1.0	U	AM
Total Strontium	SR-RAD	24.8	0.51	0.15	1.0		SR
Thorium 228	14274-82-9	0.392	0.13	0.12	1.0	J	TH
Thorium 230	14269-63-7	0.729	0.17	0.14	1.0	B J	TH
Thorium 232	TH-232	0.337	0.11	0.075	1.0	J	TH
Potassium 40	13966-00-2	9.23	0.67	0.36			GAM
Cobalt 60	10198-40-0	U		0.044	0.050	U	GAM
Cesium 137	10045-97-3	U		0.033	0.10	U	GAM
Europium 152	14683-23-9	U		0.080	0.10	U	GAM
Europium 154	15585-10-1	U		0.13	0.10	U	GAM
Europium 155	14391-16-3	U		0.067	0.10	U	GAM
Radium 226	13982-63-3	0.314	0.068	0.067	0.10		GAM
Radium 228	15262-20-1	0.469	0.15	0.15	0.20		GAM
Thorium 228	14274-82-9	0.520	0.053	0.052			GAM
Thorium 232	TH-232	0.469	0.15	0.15			GAM
Americium 241	14596-10-2	U		0.049		U	GAM
Uranium 238	U-238	U		4.8		U	GAM
Uranium 235	15117-96-1	U		0.11		U	GAM

200 Area Source chrctztn-200-CW-1 OU

RE 2/11/00

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 11/18/99

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SAMPLE DELIVERY GROUP H0534

N909117-06 B0WBR6

DATA SHEET

SDG	7212	Client/Case no	Hanford SDG H0534
Contact	Kevin C. Johnson	Contract	TRB-SBB-207925
Lab sample id	N909117-06	Client sample id	B0WBR6
Dept sample id	7212-006	Location/Matrix	200 Bpond (B8758)>15' SOLID
Received	09/17/99	Collected	09/15/99 08:34
% solids	93.4	Custody/SAF No	B99-078-120 B99-078

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	0.005	0.050	0.084	400	U J	H
Technetium 99	14133-76-7	-0.107	0.11	0.42	15	U	TC
Neptunium 237	13994-20-2	-0.007	0.015	0.046		U	NP
Total Uranium (ug/g)	7440-61-1	0.480	0.055	0.005	1.0		U_T
Plutonium 238	13981-16-3	0.005	0.019	0.037	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.010	0.036	1.0	U	PU
Nickel 63	13981-37-8	-0.909	1.7	2.8	30	U	NI_L
Americium 241	14596-10-2	-0.008	0.016	0.037	1.0	U	AM
Total Strontium	SR-RAD	19.7	0.47	0.16	1.0		SR
Thorium 228	14274-82-9	0.306	0.12	0.13	1.0	J	TH
Thorium 230	14269-63-7	0.596	0.17	0.17	1.0	J	TH
Thorium 232	TH-232	0.336	0.11	0.058	1.0	J	TH
Potassium 40	13966-00-2	8.82	0.75	0.45			GAM
Cobalt 60	10198-40-0	U		0.038	0.050	U	GAM
Cesium 137	10045-97-3	U		0.035	0.10	U	GAM
Europium 152	14683-23-9	U		0.092	0.10	U	GAM
Europium 154	15585-10-1	U		0.12	0.10	U	GAM
Europium 155	14391-16-3	U		0.095	0.10	U	GAM
Radium 226	13982-63-3	0.356	0.073	0.073	0.10		GAM
Radium 228	15262-20-1	0.447	0.15	0.16	0.20		GAM
Thorium 228	14274-82-9	0.387	0.047	0.043			GAM
Thorium 232	TH-232	0.447	0.15	0.16			GAM
Americium 241	14596-10-2	U		0.10		U	GAM
Uranium 238	U-238	U		4.5		U	GAM
Uranium 235	15117-96-1	U		0.13		U	GAM

200 Area Source chrctztn-200-CW-1 OU

2/11/00

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	11/18/99

TMA / RICHMOND

SAMPLE DELIVERY GROUP H0534

N909117-07 B0WBR7

DATA SHEET

SDG 7212	Client/Case no Hanford	SDG H0534	
Contact Kevin C. Johnson	Contract TRB-SBB-207925		
Lab sample id N909117-07	Client sample id B0WBR7		
Dept sample id 7212-007	Location/Matrix 200 Bpond (B8758)>15'	SOLID	
Received 09/17/99	Collected 09/15/99 08:34		
% solids 97.3	Custody/SAF No B99-078-120	B99-078	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	0	0.050	0.084	400	U J	H
Technetium 99	14133-76-7	-0.017	0.14	0.49	15	U	TC
Neptunium 237	13994-20-2	0	0.015	0.036		U	NP
Total Uranium (ug/g)	7440-61-1	0.439	0.051	0.005	1.0		U_T
Plutonium 238	13981-16-3	0	0.073	0.17	1.0	U	PU
Plutonium 239/240	PU-239/240	-0.036	0.073	0.22	1.0	U	PU
Nickel 63	13981-37-8	-1.14	2.0	3.4	30	U	NI_L
Americium 241	14596-10-2	0.013	0.026	0.033	1.0	U	AM
Total Strontium	SR-RAD	17.2	0.77	0.38	1.0		SR
Thorium 228	14274-82-9	0.423	0.16	0.18	1.0	J	TH
Thorium 230	14269-63-7	0.773	0.20	0.19	1.0	B J	TH
Thorium 232	TH-232	0.234	0.11	0.099	1.0	J	TH
Potassium 40	13966-00-2	8.56	0.35	0.16			GAM
Cobalt 60	10198-40-0	U		0.017	0.050	U	GAM
Cesium 137	10045-97-3	U		0.014	0.10	U	GAM
Europium 152	14683-23-9	U		0.040	0.10	U	GAM
Europium 154	15585-10-1	U		0.055	0.10	U	GAM
Europium 155	14391-16-3	U		0.043	0.10	U	GAM
Radium 226	13982-63-3	0.263	0.034	0.030	0.10		GAM
Radium 228	15262-20-1	0.478	0.075	0.066	0.20		GAM
Thorium 228	14274-82-9	0.390	0.022	0.020			GAM
Thorium 232	TH-232	0.478	0.075	0.066			GAM
Americium 241	14596-10-2	U		0.045		U	GAM
Uranium 238	U-238	U		2.0		U	GAM
Uranium 235	15117-96-1	U		0.068		U	GAM

200 Area Source chrctztn-200-CW-1 OU

2/11/00

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	11/18/99

TMA / RICHMOND

SAMPLE DELIVERY GROUP H0534

N909117-08 B0WBR8

DATA SHEET

SDG 7212	Client/Case no Hanford	SDG H0534	
Contact Kevin C. Johnson	Contract TRB-SBB-207925		
Lab sample id N909117-08	Client sample id B0WBR8		
Dept sample id 7212-008	Location/Matrix 200 Bpond (B8758)>15'	SOLID	
Received 09/17/99	Collected 09/15/99 09:45		
% solids 91.8	Custody/SAF No B99-078-121	B99-078	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Tritium	10028-17-8	0.004	0.051	0.086	400	U J	H
Technetium 99	14133-76-7	-0.024	0.16	0.49	15	U	TC
Neptunium 237	13994-20-2	0	0.025	0.051		U	NP
Total Uranium (ug/g)	7440-61-1	0.663	0.076	0.005	1.0		U_T
Plutonium 238	13981-16-3	0	0.020	0.055	1.0	U	PU
Plutonium 239/240	PU-239/240	0.005	0.020	0.047	1.0	U	PU
Nickel 63	13981-37-8	-0.865	1.4	2.4	30	U	NI_L
Americium 241	14596-10-2	0	0.023	0.042	1.0	U	AM
Total Strontium	SR-RAD	46.9	1.9	0.77	1.0		SR
Thorium 228	14274-82-9	0.502	0.14	0.12	1.0	J	TH
Thorium 230	14269-63-7	0.658	0.17	0.14	1.0	B J	TH
Thorium 232	TH-232	0.407	0.11	0.060	1.0	J	TH
Potassium 40	13966-00-2	9.02	0.55	0.30			GAM
Cobalt 60	10198-40-0	U		0.029	0.050	U	GAM
Cesium 137	10045-97-3	U		0.025	0.10	U	GAM
Europium 152	14683-23-9	U		0.073	0.10	U	GAM
Europium 154	15585-10-1	U		0.095	0.10	U	GAM
Europium 155	14391-16-3	U		0.083	0.10	U	GAM
Radium 226	13982-63-3	0.328	0.049	0.047	0.10		GAM
Radium 228	15262-20-1	0.580	0.14	0.13	0.20		GAM
Thorium 228	14274-82-9	0.487	0.036	0.036			GAM
Thorium 232	TH-232	0.580	0.14	0.13			GAM
Americium 241	14596-10-2	U		0.086		U	GAM
Uranium 238	U-238	U		3.3		U	GAM
Uranium 235	15117-96-1	U		0.12		U	GAM

200 Area Source chrctztn-200-CW-1 OU

2/11/00

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	11/18/99

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

Case Narrative

1.0 GENERAL

Bechtel Hanford Inc. Sample Delivery Group H0534 is composed of eight solid (soil) samples designated under SAF No. B99-078 with a Project Designation of: 200 Area Source characterization-200-CW-1 OU.

The samples were received as stated on the Chain-of-Custody document. Any discrepancies are noted on the TNU Sample Receipt Checklists. The results were transmitted to BHI via facsimile on November 2, 1999 with the exception of Thorium and Nickel-63 which were faxed to BHI on November 4, 1999, Isotopic Plutonium and Americium-241 which were faxed to BHI on November 5, 1999, and Neptunium which was transmitted to BHI via fax on November 8, 1999.

2.0 ANALYSIS NOTES

2.1 Total Strontium Analyses

No problems were encountered during the course of the analyses.

2.2 Total and Isotopic Uranium Analyses

Isotopic analyses were to be based on the results from the total uranium analyses. Isotopic uranium was not requested for any samples in this SDG. No problems were encountered during the course of the analyses. The RPD in the duplicate result and the original result was 42%, greater than the 3 sigma total allowable RPD of 32%.

2.3 Gamma Spec Analyses

No problems were encountered during the course of the analyses though a recount was taken on sample BOWBR4.

2.4 Isotopic Plutonium Analyses

No problems were encountered during the course of the analyses.

2.5 Americium-241 Analyses

No problems were encountered during the course of the analyses.

2.6 Tritium Analyses

No problems were encountered during the course of the analyses.

2.7 Nickel-63 Analyses

No problems were encountered during the course of the analyses.

2.8 Technetium-99 Analyses

No problems were encountered during the course of the analyses though recounts were performed for samples B0WBR6, B0WBR7, B0WBR8, the QC blank and the duplicate.

2.9 Isotopic Thorium Analyses

No problems were encountered during the course of the analyses. A recount was performed on the QC blank due to thorium-230 detected greater than the sample MDA but less than the RDL.

2.10 Neptunium-237 Analyses

No problems were encountered during the course of the analyses. A recount was performed on the QC blank.

Bechtel Hanford Inc. | **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** | B99-078-119

Collector: Bowers/Trice	Company Contact: Chris Cearlock — Telephone No.: 372-9574	Project Coordinator: TRENT, SJ	Price Code: 8N — Data Turnaround: 45 Days
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: 200 Bpond (B8758) <15'	SAF No.: B99-078	
Ice Chest No.: EML-185	Field Logbook No.: EL-1511	Method of Shipment: Fed Ex	
Shipped To: TMA/RECRA 9-14-99	Offsite Property No.: A990255	Bill of Lading/Air Bill No.: 423579529572	
		COA B20CW167C	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Sample No.	Matrix *	Sample Date	Sample Time	Preservation	Type of Container	No. of Container(s) / Volume	VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.					
				Cool 4C	sG	1 / 60mL									
				Cool 4C	sG	1 / 250mL									
				None	sG	1 / 250mL									
				Cool 4C	sG	1 / 500mL									
B0WBR0	Soil	9.14.99	1216						X			BowcRo			
B0WBR1	Soil	9.14.99	1300						X			BowcRo			
B0WBR2	Soil	9.14.99	1340						X			BowcRo			
B0WBR3 9.14.99 dc	Soil														
BowBR4	Soil	9.14.99	1510						X			BowcRo			

CHAIN OF POSSESSION — **Sign/Print Names**

	Relinquished By	Date/Time	Received By	Date/Time
1	Doug Bowers / Dave Bowers	9-14-99/1700	R of IB	9-14-99/1700
2	Relinquished By: Peter IB	9/16/99 11:30	Received By: Brent Porter	9/16/99 11:30
3	Relinquished By: Brent Porter	9/16/99 11:30	Received By: Fed Express	9/16/99 11:30
4	Relinquished By: Fed Ex	9-17-99 11:00	Received By: TMN M.Goldenberg	9.17.99 11:00

Title

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078. Out of Gamma Spec. bottle also analyze for Np-237, isotopic U, . Out of ICP bottle also analyze for NO2/NO3, IC anions, Sulfides, Ammonia, Total Cyanide, and pH.

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 -- Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241
(2) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Beryllium, Copper, Nickel, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

collector unavailable to sign COC

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

LABORATORY SECTION	Received By	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method: Disposed By	Date/Time

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-120	Page 1 of 12 CT 9/15/99

Collector Bowers/Trice	Company Contact Chris Cearlock Telephone No. 372-9574	Project Coordinator TRENT, SJ	Price Code 8N Data Turnaround 45 Days
Project Designation 200 Area Source characterization - 200-CW-1 OU	Sampling Location 200 Bpond (B8758) COLLECTED FROM GREATER THAN 15' DEPTH	SAF No. B99-078	
Ice Chest No. ERC 96 087	Field Logbook No. EL-1511	Method of Shipment Fed Ex	
Shipped To TMA/RECRA	Offsite Property No. A99-0258	Bill of Lading/Air Bill No. 4235 7952 9539	
		COA B20CW1 671C	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

			Preservation	Cool 4C	Cool 4C	None	Cool 4C					
			Type of Container	aG	aG	aG	aG					
			No. of Container(s)	1	1	1	1					
			Volume	60mL	250mL	250mL	500mL					
SAMPLE ANALYSIS				VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.					
Sample No.	Matrix *	Sample Date	Sample Time									
~~B0WBR4~~	Soil											
B0WBR5	Soil	9/15/99	0739			X					BOW	CR1
B0WBR6	Soil	9/15/99	0834			X					BOW	CR1
B0WBR7	Soil	9/15/99	0834			X					BOW	CR1

CHAIN OF POSSESSION	Sign/Print Names			
Relinquished By	Date/Time	Received By	Date/Time	
[signature]	9/15/99 1530	RJ IB	9/15/99 1530	
Rof I-B	9-16-99 1300	R. Fehlberg R. Fehlberg	9-16-99 1300	
R. Fehlberg R. Fehlberg	9-16-99 1430	Fed Ex	9-16-99	
FedEx	9-17-99 11:00	TNU M. Goldenberg	9/17-99 11:00	

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078. Out of Gamma Spec. bottle also analyze for Np-237, isotopic U, . Out of ICP bottle also analyze for NO2/NO3, IC anions, Sulfides, Ammonia, Total Cyanide, and pH.
collector not available to sign C.O.C.

(1) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-155}; Gamma Spec - Add-on {Americium-241}; Strontium-89,90 -- Total Sr; Total Uranium {Uranium}; Isotopic Plutonium; Isotopic Thorium {Thorium-232}; {Americium-241}

(2) ICP Metals - 6010A (Supertrace) {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; ICP Metals - 6010A (Supertrace Add-On) {Beryllium, Copper, Nickel, Vanadium, Zinc}; Mercury - 7471 - (CV); Chromium Hex - 7196

NOTE: OUT OF GAMMA SPEC. BOTTLE ALSO ANALYZE FOR NICKEL-63, TECH-99, TRITIUM.

Matrix *: Soil, Water, Vapor, Other Solid, Other Liquid

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

000023

Bechtel Hanford Inc. | **CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST** | B99-078-121 | Page 2 of 2 CT 9/15/99

Collector: Bowers/Trice	Company Contact: Chris Cearlock; Telephone No.: 372-9574	Project Coordinator: TRENT, SJ	Price Code: 8N; Data Turnaround: 45 Days
Project Designation: 200 Area Source characterization - 200-CW-1 OU	Sampling Location: 200 B pond (B8758) ~~>15'~~ COLLECTED FROM GREATER THAN 15' DEPTH	SAF No.: B99-078	
Ice Chest No.: ERC 96 087	Field Logbook No.: EL-1511	Method of Shipment: Fed Ex	
Shipped To: TMA/RECRA	Offsite Property No.: A 99.0258	Bill of Lading/Air Bill No.: 4235 7952 9539	
		COA B20 CW1 671C	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation				Cool 4C	Cool 4C	None	Cool 4C
Type of Container				aG	aG	aG	aG
No. of Container(s)				1	1	1	1
Volume				60mL	250mL	250mL	500mL
SAMPLE ANALYSIS				VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.
Sample No.	**Matrix***	**Sample Date**	**Sample Time**				
B0WBR8	Soil	9/15/99	0945			X	
~~B0WBR9~~	~~Soil~~	CT 9/15/99					
~~B0WBT0~~	~~Soil~~	CT 9/15/99					
~~B0WBT1~~	~~Soil~~	CT 9/15/99					

B0W1 CR1

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
C Trice	1530 9/15/99	[signature] 1-B	9/15/99 1530 CT
RoF 1-B	9-16-99 1300	R. Fehlberg / R. Fehlberg	9-16-99 1700
R. Fehlberg / R. Fehlberg	9-16-99 1430	Fed Ex	9-16-99
FedEx	9-17-99 11:00	TNV M. Goldenberg	9-17-99 9:00

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078. Out of Gamma Spec. bottle also analyze for Np-237, isotopic U, Ni-63, Tech-99, Tritium, . Out of ICP bottle also analyze for NO2/NO3, IC anions, Sulfides, Ammonia, Total Cyanide, and pH.

collector not available to sign COC

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-155); Gamma Spec - Add-on (Americium-241) (Strontium-89,90 -- Total Sr) (Total Uranium (Uranium)) Isotopic Plutonium (Isotopic Thorium (Thorium-232)) Americium-241

(2) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Beryllium, Copper, Nickel, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

NOTE: OUT OF GAMMA SPEC. BOTTLE ALSO ANALYZE FOR NICKEL-63, TECH-99 AND TRITIUM.

Matrix*: Soil, Water, Vapor, Other Solid, Other Liquid

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

0052

Appendix 5

Data Validation Supporting Documentation

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200-CW-1			DATA PACKAGE: H0534		
VALIDATOR: TLI		LAB: TNU		DATE: 12/20/99	
CASE:			SDG: H0534		

ANALYSES PERFORMED

☐ Gross Alpha/Beta	☐ Strontium-90	☐ Technetium-99	☐ Alpha Spectroscopy	☐ Gamma Spectroscopy	
☐ Total Uranium	☐ Radium-22	☐ Tritium	☐		

SAMPLES/MATRIX BOWBR0 BOWBR1 BOWBR2 BOWBR4 BOWBR5 BOWBR6 BOWBR7 BOWBR8

Soil

1. Completeness . . . . . ☒ N/A

Technical verification forms present? . . . . . Yes No N/A

Comments:_____

2. Initial Calibration . . . . . ☒ N/A

Instruments/detectors calibrated within one year of sample analysis? . . . . . Yes No N/A

Initial calibration acceptable? . . . . . Yes No N/A

Standards NIST traceable? . . . . . Yes No N/A

Standards Expired? . . . . . Yes No N/A

Comments:_____

3. Continuing Calibration . . . . . ☒ N/A

Calibration checked within one week of sample analysis? . . .	Yes	No	N/A
Calibration check acceptable?	Yes	No	N/A
Calibration check standards NIST traceable?	Yes	No	N/A
Calibration check standards expired?	Yes	No	N/A

Comments:

4. Blanks . . . . . ☐ N/A

Method blank analyzed?	(Yes)	No	N/A
Method blank results acceptable?	Yes	(No)	N/A
Analytes detected in method blank?	(Yes)	No	N/A
Field blank(s) analyzed?	Yes	(No)	N/A
Field blank results acceptable?	Yes	No	(N/A)
Analytes detected in field blank(s)?	Yes	No	(N/A)
Transcription/Calculation Errors?	Yes	No	(N/A)

Comments: R0, R1, R2, R4, R5, R6, R7, R8 – Th230 – J Blank

154 – above MDA in MB

5. Matrix Spikes . . . . . ☐ N/A

Matrix spike analyzed?	Yes	(No)	N/A
Spike recoveries acceptable?	Yes	No	(N/A)
Spike source traceable?	Yes	No	(N/A)
Spike source expired?	Yes	No	(N/A)
Transcription/Calculation Errors?	Yes	No	(N/A)

Comments: 1R J 3H

6. Laboratory Control Samples . . . . . ☐ N/A

LCS analyzed?	(Yes)	No	N/A
LCS recoveries acceptable?	(Yes)	No	N/A
LCS traceable?	Yes	No	(N/A)
Transcription/Calculation Errors?	Yes	No	(N/A)

Comments: _____

7. Chemical Recovery . . . . . ☐ N/A

Chemical carrier added?	(Yes)	No	N/A
Chemical recovery acceptable?	Yes	(No)	N/A
Chemical carrier traceable?	Yes	No	(N/A)
Chemical carrier expired?	Yes	No	(N/A)
Transcription/Calculation errors?	Yes	No	(N/A)

Comments: BOWBR7 – ~~Pu~~ 2370 yield for Pu 238 239/40 Pu 238 239/40

8. Duplicates . . . . . ☐ N/A

Duplicates Analyzed?	(Yes)	No	N/A
RPD Values Acceptable?	(Yes)	No	N/A
Transcription/Calculation Errors?	Yes	No	(N/A)

Comments: _____

9. Field QC Samples . . . . . ☐ N/A

Field duplicate sample(s) analyzed?	Yes	No	N/A
Field duplicate RPD values acceptable?	Yes	No	N/A
Field split sample(s) analyzed?	Yes	No	N/A
Field split RPD values acceptable?	Yes	No	N/A
Performance audit sample(s) analyzed?	Yes	No	N/A
Performance audit sample results acceptable?	Yes	No	N/A

Comments:

10. Holding Times

Are sample holding times acceptable?	Yes	No	N/A

Comments:

11. Results and Detection Limits (Levels D & E) . . . . . ☐ N/A

Results reported for all required sample analyses?	Yes	No	N/A
Results supported in raw data?	Yes	No	N/A
Results Acceptable?	Yes	No	N/A
Transcription/Calculation errors?	Yes	No	N/A
MDA's meet required detection limits?	Yes	No	N/A
Transcription/calculation errors?	Yes	No	N/A

Comments: R0 - C060, 152, 154 R1 - 152, 154, 155 R2 - ok R4 - ok R5 - 154 R6 - 154 R7 - ok R8 - C0 - 155 ok

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0534

METHOD SUMMARY

THORIUM, ISOTOPIC IN SOIL

ALPHA SPECTROSCOPY

Test TH Matrix SOLID
SDG 7212
Contact Kevin C. Johnson

Client Hanford
Contract TRP-SBP-207925
Case no SDG H0534

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Thorium 228	Thorium 230	Thorium 232
Preparation batch 6904-010							
BOWBR0	N909117-01			7212-001	0.808 J	0.848 J	0.791 J
BOWBR1	N909117-02			7212-002	0.699 J	1.13	0.662 J
BOWBR2	N909117-03			7212-003	0.421 J	0.491 J	0.358 J
BOWBR4	N909117-04			7212-004	0.468 J	0.574 J	0.429 J
BOWBR5	N909117-05			7212-005	0.392 J	0.729 J	0.337 J
BOWBR6	N909117-06			7212-006	0.306 J	0.596 J	0.336 J
BOWBR7	N909117-07			7212-007	0.423 J	0.773 J	0.234 J
BOWBR8	N909117-08			7212-008	0.502 J	0.658 J	0.407 J
BLK (QC ID-32081)	N909117-10			7212-010	U	0.262 J	U
LCS (QC ID-32080)	N909117-09			7212-009		ok	
Duplicate (N909117-05)	N909117-11			7212-011	ok J	ok J	ok J
Nominal values and limits from method				RDLs (pCi/g)	1.0	1.0	1.0
200 Area Source chrctstn-200-CN-1 OU							

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6904-010 2σ prep error 5.0 % Reference Lab Notebook 6904 pg. 010																
BOWBR0	N909117-01			0.14	0.250			88		661			44	10/28/99	10/28	SS-029
BOWBR1	N909117-02			0.15	0.250			87		660			44	10/28/99	10/28	SS-031
BOWBR2	N909117-03			0.14	0.250			89		660			44	10/28/99	10/28	SS-032
BOWBR4	N909117-04			0.18	0.250			94		660			44	10/28/99	10/28	SS-033
BOWBR5	N909117-05			0.14	0.250			92		660			43	10/28/99	10/28	SS-034
BOWBR6	N909117-06			0.17	0.250			96		659			43	10/28/99	10/28	SS-035
BOWBR7	N909117-07			0.19	0.250			92		659			43	10/28/99	10/28	SS-036
BOWBR8	N909117-08			0.14	0.250			96		659			43	10/28/99	10/28	SS-038
BLK (QC ID-32081)	N909117-10			0.16	0.250			88		772				10/28/99	11/02	SS-048
LCS (QC ID-32080)	N909117-09			0.17	0.250			91		658				10/28/99	10/28	SS-040
Duplicate (N909117-05) (QC ID-32082)	N909117-11			0.16	0.250			96		655			43	10/28/99	10/28	SS-044
Nominal values and limits from method				1.0	0.250			20-105		200			180			

Lab id TMAMC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 1.06
Report date 02/10/00

Date: 21 January 2000
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 200 Area Source Characterization - 200-CW-1 Operable Unit
Subject: Semivolatiles - Data Package No. H0534-RLN (SDG No. H0534)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0534-RLN prepared by Recra LabNet (RLN). A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B0WBR0	9/14/99	Soil	C	See note 1
B0WBR1	9/14/99	Soil	C	See note 1
B0WBR2	9/14/99	Soil	C	See note 1
B0WBR4	9/14/99	Soil	C	See note 1
B0WBR5	9/15/99	Soil	C	See note 1
B0WBR6	9/15/99	Soil	C	See note 1
B0WBR7	9/15/99	Soil	C	See note 1
B0WBR8	9/15/99	Soil	C	See note 1

1 - Semivolatiles by EPA 8270B

Data validation was conducted in accordance with the BHI validation statement of work and the *200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan*, DOE/RL-99-07, Draft B. Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
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DATA QUALITY OBJECTIVES

- **Holding Times**

  Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

  If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

  All holding times were met.

- **Blanks**

  Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

  All method blank results were acceptable.

- **Accuracy**

  Matrix Spike/Matrix Spike Duplicate Recoveries

  Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 70% to 130%. If spike recoveries are

outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to a matrix spike recovery of 57% and matrix spike duplicate recovery of 57%, all phenol, 2-methylphenol, 4-methylphenol, 2,4-dimethylphenol, dimethylphthalate, di-n-butylphthalate, butylbenzylphthalate, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, and isophorone results in samples B0WBR0, BOWBR1, BOWBR2, and B0WBR4 were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 59% and a matrix spike duplicate recovery of 57%, all pentachlorphenol, 2,4,6-trichlorophenol and 2,4,5-trichlorophenol results in samples B0WBR0, BOWBR1, BOWBR2, and B0WBR4 were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 66% and a matrix spike duplicate recovery of 67%, all 1,3,-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, hexachloroethane, hexachlorobutadiene and hexaclorocyclopentadiene results in samples B0WBR0, BOWBR1, BOWBR2, and B0WBR4 were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 61% and a matrix spike duplicate recovery of 62%, all 4-chloro-3-methylphenol in samples B0WBR0, BOWBR1, BOWBR2, and B0WBR4 results were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 53% and a matrix spike duplicate recovery of 46%, all 4-nitrophenol, 2-nitrophenol and 2,4-dinitrophenol results in samples B0WBR0, BOWBR1, BOWBR2, and B0WBR4 were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 69% and a matrix spike duplicate recovery of 69%, all acenaphthene, naphthalene, acenaphthylene, fluorene, phenathrene, anthracene, fluoranthene and 2-chloronaphthalene results in samples B0WBR0, BOWBR1, BOWBR2, and B0WBR4 were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 57% and a matrix spike duplicate recovery of 57%, all 2-chlorophenol, 2,4-dichlorophenol, 4-chloro-3-methylphenol, bis(2-chloroethyl)ether, bis(2-chloroethoxy)methane, 4-chorophenyl phenyl ether, and 4-bromophenyl phenyl ether results in samples B0WBR0, BOWBR1, BOWBR2, and B0WBR4 were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 58% and matrix spike duplicate recovery of 51%, all phenol, 2-methylphenol, 4-methylphenol, 2,4-dimethylphenol, dimethylphthalate, di-n-butylphthalate, butylbenzylphthalate, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, and isophorone results in samples B0WBR5, B0WBR6, B0WBR7, and B0WBR8 were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 56% and a matrix spike duplicate recovery of 55%, all pentachlorphenol, 2,4,6-trichlorophenol and 2,4,5-trichlorophenol results in samples B0WBR5, B0WBR6, B0WBR7, and B0WBR8 were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 63% and a matrix spike duplicate recovery of 60%, all 1,3,-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, hexachloroethane, hexachlorobutadiene and hexaclorocyclopentadiene results in samples B0WBR5, B0WBR6, B0WBR7, and B0WBR8 were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 61% and a matrix spike duplicate recovery of 60%, all 4-chloro-3-methylphenol results in samples B0WBR5, B0WBR6, B0WBR7, and B0WBR8 were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 48% and a matrix spike duplicate recovery of 57%, all 4-nitrophenol, 2-nitrophenol and 2,4-dinitrophenol results in samples B0WBR5, B0WBR6, B0WBR7, and B0WBR8 were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 65% and a matrix spike duplicate recovery of 64%, all acenaphthene, naphthalene, acenaphthylene, fluorene, phenathrene, anthracene, fluoranthene and 2-chloronaphthalene results in samples B0WBR5, B0WBR6, B0WBR7, and B0WBR8 were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 53% and a matrix spike duplicate recovery of 53%, all 2-chlorophenol, 2,4-dichlorophenol, 4-chloro-3-methylphenol, bis(2-chloroethyl)ether, bis(2-chloroethoxy)methane, 4-chorophenyl phenyl ether, and 4-bromophenyl phenyl ether results in samples B0WBR5, B0WBR6, B0WBR7, and B0WBR8 were qualified as estimates and flagged "J".

Due to a matrix spike recovery of 65% and a matrix spike duplicate recovery of 63%, all 1,2,4-trichlorobenzene and hexachlorobenzene results were qualified as estimates and flagged "J".

Due to a matrix spike duplicate recovery of 66%, all pyrene, phenanthrene, anthracene, fluorathene, benzo(a)anthracene, chrysene, benzo(b)fluoranthrene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-c,d)pyrene and

benzo(g,h,i)perylene results in samples B0WBR5, B0WBR6, B0WBR7, and B0WBR8 were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the CRQL are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

All sample surrogate recovery results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All MS/MSD RPD results were acceptable.

Field Duplicate Samples

One pair of field duplicate samples (samples B0WBR6/B0WBR7) were submitted to RLN for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All field duplicate results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the CRQLs to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels for undetected analytes were above the analyte specific CRQL. Under the BHI statement of work, no qualification is required.

- **Completeness**

Data package No. H0534 was submitted for validation and verified for completeness. The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiencies were found:

- Due to a matrix spike recovery of 57% and matrix spike duplicate recovery of 57%, all phenol, 2-methylphenol, 4-methylphenol, 2,4-dimethylphenol, dimethylphthalate, di-n-butylphthalate, butylbenzylphthalate, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, and isophorone results in samples B0WBR0, BOWBR1, BOWBR2; and B0WBR4 were qualified as estimates and flagged "J".

- Due to a matrix spike recovery of 59% and a matrix spike duplicate recovery of 57%, all pentachlorphenol, 2,4,6-trichlorophenol and 2,4,5-trichlorophenol results in samples B0WBR0, BOWBR1, BOWBR2, and B0WBR4 were qualified as estimates and flagged "J".

- Due to a matrix spike recovery of 66% and a matrix spike duplicate recovery of 67%, all 1,3,-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, hexachloroethane, hexachlorobutadiene and hexaclorocyclopentadiene results in samples B0WBR0, BOWBR1, BOWBR2, and B0WBR4 were qualified as estimates and flagged "J".

- Due to a matrix spike recovery of 61% and a matrix spike duplicate recovery of 62%, all 4-chloro-3-methylphenol in samples B0WBR0, BOWBR1, BOWBR2, and B0WBR4 results were qualified as estimates and flagged "J".

- Due to a matrix spike recovery of 53% and a matrix spike duplicate recovery of 46%, all 4-nitrophenol, 2-nitrophenol and 2,4-dinitrophenol results in samples B0WBR0, B0WBR1, B0WBR2, and B0WBR4 were qualified as estimates and flagged "J".

- Due to a matrix spike recovery of 69% and a matrix spike duplicate recovery of 69%, all acenaphthene, naphthalene, acenaphthylene, fluorene, phenathrene, anthracene, fluoranthene and 2-chloronaphthalene results in samples B0WBR0, B0WBR1, B0WBR2, and B0WBR4 were qualified as estimates and flagged "J".

- Due to a matrix spike recovery of 57% and a matrix spike duplicate recovery of 57%, all 2-chlorophenol, 2,4-dichlorophenol, 4-chloro-3-methylphenol, bis(2-chloroethyl)ether, bis(2-chloroethoxy)methane, 4-chorophenyl phenyl ether, and 4-bromophenyl phenyl ether results in samples B0WBR0, B0WBR1, B0WBR2, and B0WBR4 were qualified as estimates and flagged "J".

- Due to a matrix spike recovery of 58% and matrix spike duplicate recovery of 51%, all phenol, 2-methylphenol, 4-methylphenol, 2,4-dimethylphenol, dimethylphthalate, di-n-butylphthalate, butylbenzylphthalate, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, and isophorone results in samples B0WBR5, B0WBR6, B0WBR7, and B0WBR8 were qualified as estimates and flagged "J".

- Due to a matrix spike recovery of 56% and a matrix spike duplicate recovery of 55%, all pentachlorphenol, 2,4,6-trichlorophenol and 2,4,5-trichlorophenol results in samples B0WBR5, B0WBR6, B0WBR7, and B0WBR8 were qualified as estimates and flagged "J".

- Due to a matrix spike recovery of 63% and a matrix spike duplicate recovery of 60%, all 1,3,-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, hexachloroethane, hexachlorobutadiene and hexaclorocyclopentadiene results in samples B0WBR5, B0WBR6, B0WBR7, and B0WBR8 were qualified as estimates and flagged "J".

- Due to a matrix spike recovery of 61% and a matrix spike duplicate recovery of 60%, all 4-chloro-3-methylphenol results in samples B0WBR5, B0WBR6, B0WBR7, and B0WBR8 were qualified as estimates and flagged "J".

- Due to a matrix spike recovery of 48% and a matrix spike duplicate recovery of 57%, all 4-nitrophenol, 2-nitrophenol and 2,4-dinitrophenol results in samples B0WBR5, B0WBR6, B0WBR7, and B0WBR8 were qualified as estimates and flagged "J".

- Due to a matrix spike recovery of 65% and a matrix spike duplicate recovery of 64%, all acenaphthene, naphthalene, acenaphthylene, fluorene, phenathrene,

anthracene, fluoranthene and 2-chloronaphthalene results in samples B0WBR5, B0WBR6, B0WBR7, and B0WBR8 were qualified as estimates and flagged "J".

- Due to a matrix spike recovery of 53% and a matrix spike duplicate recovery of 53%, all 2-chlorophenol, 2,4-dichlorophenol, 4-chloro-3-methylphenol, bis(2-chloroethyl)ether, bis(2-chloroethoxy)methane, 4-chorophenyl phenyl ether, and 4-bromophenyl phenyl ether results in samples B0WBR5, B0WBR6, B0WBR7, and B0WBR8 were qualified as estimates and flagged "J".

- Due to a matrix spike recovery of 65% and a matrix spike duplicate recovery of 63%, all 1,2,4-trichlorobenzene and hexachlorobenzene results were qualified as estimates and flagged "J".

- Due to a matrix spike duplicate recovery of 66%, all pyrene, phenanthrene, anthracene, fluorathene, benzo(a)anthracene, chrysene, benzo(b)fluoranthrene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-c,d)pyrene and benzo(g,h,i)perylene results in samples B0WBR5, B0WBR6, B0WBR7, and B0WBR8 were qualified as estimates and flagged "J".

Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

All reported laboratory detection levels for undetected analytes were above the analyte specific CRQL. Under the BHI statement of work, no qualification is required.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-99-07, Draft B, *200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan*.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, but the data are usable for decision-making purposes.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H0534	REVIEWER:TLI	1/21/00	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES	REASON
Phenol, 2-methylphenol, 4-methylphenol, 2,4-dimethylphenol, dimethylphthalate, di-n-butylphthalate, butylbenzylphthalate, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, isophorone, pentachlorphenol, 2,4,6-trichlorophenol, 2,4,5-trichlorophenol 1,3,-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, hexachloroethane, hexachlorobutadiene, hexaclorocyclopentadiene, 4-chloro-3-methylphenol 4-nitrophenol, 2-nitrophenol, 2,4-dinitrophenol, acenaphthene, naphthalene, acenaphthylene, fluorene, phenathrene, anthracene, fluoranthene, 2-chloronaphthalene, 2-chlorophenol, 2,4-dichlorophenol, bis(2-chloroethyl)ether, bis(2-chloroethoxy)methane, 4-chorophenyl phenyl ether, 4-bromophenyl phenyl ether	J	All	MS/MSD recovery

DATA QUALIFICATION SUMMARY

1,2,4-trichlorobenzene, hexachlorobenzene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthrene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-c,d)pyrene benzo(g,h,i)perylene	J	B0WBR5, B0WBR6, B0WBR7, B0WBR8	MS/MSD percent recovery

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

SEMIVOLATILE ANALYSIS, SOIL MATRIX, (UG/KG) Page__1__ of__2__

Project: BECHTEL-HANFORD																	
Laboratory: RECRA LabNet																	
Case:	SDG: H0534																
Sample Number		B0WBR0		B0WBR1		B0WBR2		B0WBR4		B0WBR5		B0WBR6		B0WBR7		B0WBR8	
Location		B8758		B8758		B8758		B8758		B8758		B8758		B8758		B8758	
Remarks														Duplicate			
Sample Date		9/14/99		9/14/99		9/14/99		9/14/99		9/15/99		9/15/99		9/15/99		9/15/99	
Extraction Date		9/20/99		9/20/99		9/20/99		9/20/99		9/20/99		9/20/99		9/20/99		9/20/99	
Analysis Date		9/29/99		9/29/99		9/30/99		9/30/99		9/28/99		9/28/99		9/28/99		9/28/99	
Semivolatile (8270B)	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Phenol	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
bis(2-Chloroethyl)ether	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
2-Chlorophenol	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
1,3-Dichlorobenzene	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
1,4-Dichlorobenzene	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
1,2-Dichlorobenzene	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
2-Methylphenol	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
2,2'-oxybis(1-Chloropropane)	330	370	U	360	U	340	U	340	U	340	U	350	U	350	U	370	U
4-Methylphenol	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
N-Nitroso-di-n-propylamine	330	370	U	360	U	340	U	340	U	340	U	350	U	350	U	370	U
Hexachloroethane	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
Nitrobenzene	330	370	U	360	U	340	U	340	U	340	U	350	U	350	U	370	U
Isophorone	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
2-Nitrophenol	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
2,4-Dimethylphenol	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
bis(2-Chloroethoxy)methane	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
2,4-Dichlorophenol	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
1,2,4-Trichlorobenzene	330	370	U	360	U	340	U	340	U	340	UJ	350	UJ	350	UJ	370	UJ
Naphthalene	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
4-Chloroaniline	330	370	U	360	U	340	U	340	U	340	U	350	U	350	U	370	U
Hexachlorobutadiene	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
4-Chloro-3-methylphenol	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
2-Methylnaphthalene	330	370	U	360	U	340	U	340	U	340	U	350	U	350	U	370	U
Hexachlorocyclopentadiene	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
2,4,6-Trichlorophenol	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
2,4,5-Trichlorophenol	800	920	UJ	900	UJ	860	UJ	850	UJ	850	UJ	880	UJ	870	UJ	920	UJ
2-Chloronaphthalene	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
2-Nitroaniline	800	920	U	900	U	860	U	850	U	850	U	880	U	870	U	920	U
Dimethylphthalate	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
Acenaphthylene	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
2,6-Dinitrotoluene	330	370	U	360	U	340	U	340	U	340	U	350	U	350	U	370	U

SEMIVOLATILE ANALYSIS, SOIL MATRIX, (UG/KG) Page__2__ of__2__

Project: BECHTEL-HANFORD																	
Laboratory: RECRA LabNet																	
Case:	SDG: H0534																
Sample Number		B0WBR0		B0WBR1		B0WBR2		B0WBR4		B0WBR5		B0WBR6		B0WBR7		B0WBR8	
Location		B8758		B8758		B8758		B8758		B8758		B8758		B8758		B8758	
Remarks														Duplicate			
Sample Date		9/14/99		9/14/99		9/14/99		9/14/99		9/15/99		9/15/99		9/15/99		9/15/99	
Extraction Date		9/20/99		9/20/99		9/20/99		9/20/99		9/20/99		9/20/99		9/20/99		9/20/99	
Analysis Date		9/29/99		9/29/99		9/30/99		9/30/99		9/28/99		9/28/99		9/28/99		9/28/99	
Semivolatile (8270B)	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
3-Nitroaniline	800	920	U	900	U	860	U	850	U	850	U	880	U	870	U	920	U
Acenaphthene	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
2,4-Dinitrophenol	800	920	UJ	900	UJ	860	UJ	850	UJ	850	UJ	880	UJ	870	UJ	920	UJ
4-Nitrophenol	800	920	UJ	900	UJ	860	UJ	850	UJ	850	UJ	880	UJ	870	UJ	920	UJ
Dibenzofuran	330	370	U	360	U	340	U	340	U	340	U	350	U	350	U	370	U
2,4-Dinitrotoluene	330	370	U	360	U	340	U	340	U	340	U	350	U	350	U	370	U
Diethylphthalate	330	370	U	360	U	340	U	340	U	340	U	350	U	350	U	370	U
4-Chlorophenyl-phenyl ether	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
Fluorene	330	370	UJ	360	UJ	360	UJ	850	UJ	850	UJ	350	UJ	350	UJ	370	UJ
4-Nitroaniline	800	920	U	900	U	860	U	850	U	850	U	880	U	870	U	920	U
4,6-Dinitro-2-methylphenol	800	920	U	900	U	860	U	850	U	850	U	880	U	870	U	920	U
N-Nitrosodiphenylamine	330	370	U	360	U	340	U	340	U	340	U	350	U	350	U	370	U
4-Bromophenyl-phenyl ether	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
Hexachlorobenzene	330	370	U	360	U	340	U	340	U	340	UJ	350	UJ	350	UJ	370	UJ
Pentachlorophenol	800	920	UJ	900	UJ	860	UJ	850	UJ	850	UJ	880	UJ	870	UJ	920	UJ
Phenanthrene	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
Anthracene	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
Carbazole	330	370	U	360	U	340	U	340	U	340	U	350	U	350	U	370	U
Di-n-butylphthalate	330	370	UJ	360	UJ	340	UJ	340	UJ	18	UJ	350	UJ	350	UJ	370	UJ
Fluoranthene	330	370	UJ	360	UJ	340	UJ	340	UJ	18	J	350	UJ	350	UJ	370	UJ
Pyrene	330	370	U	360	U	340	U	340	U	340	UJ	350	UJ	350	UJ	370	UJ
Butylbenzylphthalate	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
3,3'-Dichlorobenzidine	330	370	U	360	U	340	U	340	U	340	U	350	U	350	U	370	U
Benzo(a)anthracene	330	370	U	360	U	340	U	340	U	340	UJ	350	UJ	350	UJ	370	UJ
Chrysene	330	370	U	360	U	340	U	340	U	340	UJ	350	UJ	350	UJ	370	UJ
bis(2-Ethylhexyl)phthalate	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
Di-n-octylphthalate	330	370	UJ	360	UJ	340	UJ	340	UJ	340	UJ	350	UJ	350	UJ	370	UJ
Benzo(b)fluoranthene	330	370	U	360	U	340	U	340	U	340	UJ	350	UJ	350	UJ	370	UJ
Benzo(k)fluoranthene	330	370	U	360	U	340	U	340	U	340	UJ	350	UJ	350	UJ	370	UJ
Benzo(a)pyrene	330	370	U	360	U	340	U	340	U	340	UJ	350	UJ	350	UJ	370	UJ
Indeno(1,2,3-cd)pyrene	330	370	U	360	U	340	U	340	U	340	UJ	350	UJ	350	UJ	370	UJ
Dibenz(a,h)anthracene	330	370	U	360	U	340	U	340	U	340	U	350	U	350	U	370	U
Benzo(g,h,i)perylene	330	370	U	360	U	340	U	340	U	340	UJ	350	UJ	350	UJ	370	UJ

000016

	Cust ID:	B0WBR0	B0WBR0	B0WBR0	B0WBR1	B0WBR2	B0WBR4
Sample Information	RFW#:	001	001 MS	001 MSD	002	003	004
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate Recovery	Nitrobenzene-d5	76 %	79 %	76 %	81 %	88 %	88 %
	2-Fluorobiphenyl	64 %	68 %	65 %	73 %	73 %	71 %
	Terphenyl-d14	68 %	70 %	73 %	75 %	76 %	79 %
	Phenol-d5	63 %	61 %	60 %	62 %	70 %	72 %
	2-Fluorophenol	57 %	61 %	59 %	60 %	64 %	63 %
	2,4,6-Tribromophenol	56 %	58 %	55 %	56 %	58 %	61 %
Phenol		370 U J	57 %	57 %	360 U J	340 U J	340 U J
bis(2-Chloroethyl)ether		370 U	370 U	370 U	360 U	340 U	340 U
2-Chlorophenol		370 U	57 %	57 %	360 U	340 U	340 U
1,3-Dichlorobenzene		370 U	370 U	370 U	360 U	340 U	340 U
1,4-Dichlorobenzene		370 U	66 %	67 %	360 U	340 U	340 U
1,2-Dichlorobenzene		370 U	370 U	370 U	360 U	340 U	340 U
2-Methylphenol		370 U	370 U	370 U	360 U	340 U	340 U
2,2'-oxybis(1-Chloropropane)		370 U	370 U	370 U	360 U	340 U	340 U
4-Methylphenol		370 U J	370 U	370 U	360 U J	340 U J	340 U J
N-Nitroso-di-n-propylamine		370 U	100 %	99 %	360 U	340 U	340 U
Hexachloroethane		370 U J	370 U	370 U	360 U J	340 U J	340 U J
Nitrobenzene		370 U	370 U	370 U	360 U	340 U	340 U
Isophorone		370 U J	370 U	370 U	360 U J	340 U J	340 U J
2-Nitrophenol		370 U	370 U	370 U	360 U	340 U	340 U
2,4-Dimethylphenol		370 U	370 U	370 U	360 U	340 U	340 U
bis(2-Chloroethoxy)methane		370 U	370 U	370 U	360 U	340 U	340 U
2,4-Dichlorophenol		370 U	370 U	370 U	360 U	340 U	340 U
1,2,4-Trichlorobenzene		370 U	72 %	73 %	360 U	340 U	340 U
Naphthalene		370 U J	370 U	370 U	360 U J	340 U J	340 U J
4-Chloroaniline		370 U	370 U	370 U	360 U	340 U	340 U
Hexachlorobutadiene		370 U J	370 U	370 U	360 U J	340 U J	340 U J
4-Chloro-3-methylphenol		370 U J	61 %	62 %	360 U J	340 U J	340 U J
2-Methylnaphthalene		370 U	370 U	370 U	360 U	340 U	340 U
Hexachlorocyclopentadiene		370 U J	370 U	370 U	360 U J	340 U J	340 U J
2,4,6-Trichlorophenol		370 U J	370 U	370 U	360 U J	340 U J	340 U J
2,4,5-Trichlorophenol		920 U J	920 U	920 U	900 U J	860 U J	850 U J

*= Outside of EPA CLP QC limits.

	Cust ID:	B0WBR0	B0WBR0	B0WBR0	B0WBR1	B0WBR2	B0WBR4
	RFW#:	001	001 MS	001 MSD	002	003	004
2-Chloronaphthalene		370 UJ	370 U	370 U	360 UJ	340 UJ	340 UJ
2-Nitroaniline		920 U	920 U	920 U	900 U	860 U	850 U
Dimethylphthalate		370 UJ	370 U	370 U	360 UJ	340 UJ	340 UJ
Acenaphthylene		370 UJ	370 U	370 U	360 UJ	340 UJ	340 UJ
2,6-Dinitrotoluene		370 U	370 U	370 U	360 U	340 U	340 U
3-Nitroaniline		920 U	920 U	920 U	900 U	860 U	850 U
Acenaphthene		370 UJ	69 %	69 %	360 UJ	340 UJ	340 UJ
2,4-Dinitrophenol		920 UJ	920 U	920 U	900 UJ	860 UJ	850 UJ
4-Nitrophenol		920 UJ	53 %	46 %	900 UJ	860 UJ	850 UJ
Dibenzofuran		370 U	370 U	370 U	360 U	340 U	340 U
2,4-Dinitrotoluene		370 U	78 %	74 %	360 U	340 U	340 U
Diethylphthalate		370 U	370 U	370 U	360 U	340 U	340 U
4-Chlorophenyl-phenylether		370 UJ	370 U	370 U	360 UJ	340 UJ	340 UJ
Fluorene		370 UJ	370 U	370 U	360 UJ	340 UJ	340 UJ
4-Nitroaniline		920 U	920 U	920 U	900 U	860 U	850 U
4,6-Dinitro-2-methylphenol		920 U	920 U	920 U	900 U	860 U	850 U
N-Nitrosodiphenylamine (1)		370 U	370 U	370 U	360 U	340 U	340 U
4-Bromophenyl-phenylether		370 UJ	370 U	370 U	360 UJ	340 UJ	340 UJ
Hexachlorobenzene		370 U	370 U	370 U	360 U	340 U	340 U
Pentachlorophenol		920 UJ	59 %	59 %	900 UJ	860 UJ	850 UJ
Phenanthrene		370 UJ	370 U	370 U	360 UJ	340 UJ	340 UJ
Anthracene		370 UJ	370 U	370 U	360 UJ	340 UJ	340 UJ
Carbazole		370 U	370 U	370 U	360 U	340 U	340 U
Di-n-butylphthalate		370 UJ	370 U	370 U	360 UJ	340 UJ	340 UJ
Fluoranthene		370 UJ	370 U	370 U	360 UJ	340 UJ	340 UJ
Pyrene		370 U	73 %	78 %	360 U	340 U	340 U
Butylbenzylphthalate		370 UJ	370 U	370 U	360 UJ	340 UJ	340 UJ
3,3'-Dichlorobenzidine		370 U	370 U	370 U	360 U	340 U	340 U
Benzo(a)anthracene		370 U	370 U	370 U	360 U	340 U	340 U
Chrysene		370 U	370 U	370 U	360 U	340 U	340 U
bis(2-Ethylhexyl)phthalate		370 UJ	370 U	370 U	360 UJ	340 UJ	340 UJ
Di-n-octyl phthalate		370 UJ	370 U	370 U	360 UJ	340 UJ	340 UJ
Benzo(b)fluoranthene		370 U	370 U	370 U	360 U	340 U	340 U
Benzo(k)fluoranthene		370 U	370 U	370 U	360 U	340 U	340 U
Benzo(a)pyrene		370 U	370 U	370 U	360 U	340 U	340 U
Indeno(1,2,3-cd)pyrene		370 U	370 U	370 U	360 U	340 U	340 U
Dibenz(a,h)anthracene		370 U	370 U	370 U	360 U	340 U	340 U
Benzo(g,h,i)perylene		370 U	370 U	370 U	360 U	340 U	340 U

(1) - Cannot be separated from Diphenylamine. *= Outside of EPA CLP QC limits.

Recra LabNet - Lionville Laboratory
Semivolatiles by GC/MS, HSL List Report Date: 10/26/99 14:07
RFW Batch Number: 9909L129 Client: TNU-HANFORD B99-078 Work Order: 10985001001 Page: 2a

		Cust ID:	SBLKCZ		SBLKCZ BS	
Sample Information		RFW#:	99LE1143-MB1		99LE1143-MB1	
		Matrix:	SOIL		SOIL	
		D.F.:	1.00		1.00	
		Units:	UG/KG		UG/KG	
Surrogate Recovery	Nitrobenzene-d5		96	%	92	%
	2-Fluorobiphenyl		81	%	71	%
	Terphenyl-d14		88	%	76	%
	Phenol-d5		74	%	66	%
	2-Fluorophenol		68	%	67	%
	2,4,6-Tribromophenol		74	%	70	%
Phenol			330	U	61	%
bis(2-Chloroethyl)ether			330	U	330	U
2-Chlorophenol			330	U	62	%
1,3-Dichlorobenzene			330	U	330	U
1,4-Dichlorobenzene			330	U	75	%
1,2-Dichlorobenzene			330	U	330	U
2-Methylphenol			330	U	330	U
2,2'-oxybis(1-Chloropropane)			330	U	330	U
4-Methylphenol			330	U	330	U
N-Nitroso-di-n-propylamine			330	U	120	%
Hexachloroethane			330	U	330	U
Nitrobenzene			330	U	330	U
Isophorone			330	U	330	U
2-Nitrophenol			330	U	330	U
2,4-Dimethylphenol			330	U	330	U
bis(2-Chloroethoxy)methane			330	U	330	U
2,4-Dichlorophenol			330	U	330	U
1,2,4-Trichlorobenzene			330	U	80	%
Naphthalene			330	U	330	U
4-Chloroaniline			330	U	330	U
Hexachlorobutadiene			330	U	330	U
4-Chloro-3-methylphenol			330	U	74	%
2-Methylnaphthalene			330	U	330	U
Hexachlorocyclopentadiene			330	U	330	U
2,4,6-Trichlorophenol			330	U	330	U
2,4,5-Trichlorophenol			840	U	840	U

*= Outside of EPA CLP QC limits.

000019

RL 2/10/00

Cust ID: SBLKCZ SBLKCZ BS

RFW#: 99LE1143-MB1 99LE1143-MB1

2-Chloronaphthalene	330	U	330	U
2-Nitroaniline	840	U	840	U
Dimethylphthalate	330	U	330	U
Acenaphthylene	330	U	330	U
2,6-Dinitrotoluene	330	U	330	U
3-Nitroaniline	840	U	840	U
Acenaphthene	330	U	75	%
2,4-Dinitrophenol	840	U	840	U
4-Nitrophenol	840	U	74	%
Dibenzofuran	330	U	330	U
2,4-Dinitrotoluene	330	U	91 *	%
Diethylphthalate	330	U	330	U
4-Chlorophenyl-phenylether	330	U	330	U
Fluorene	330	U	330	U
4-Nitroaniline	840	U	840	U
4,6-Dinitro-2-methylphenol	840	U	840	U
N-Nitrosodiphenylamine (1)	330	U	330	U
4-Bromophenyl-phenylether	330	U	330	U
Hexachlorobenzene	330	U	330	U
Pentachlorophenol	840	U	69	%
Phenanthrene	330	U	330	U
Anthracene	330	U	330	U
Carbazole	330	U	330	U
Di-n-butylphthalate	330	U	330	U
Fluoranthene	330	U	330	U
Pyrene	330	U	79	%
Butylbenzylphthalate	330	U	330	U
3,3'-Dichlorobenzidine	330	U	330	U
Benzo(a)anthracene	330	U	330	U
Chrysene	330	U	330	U
bis(2-Ethylhexyl)phthalate	330	U	330	U
Di-n-octyl phthalate	330	U	330	U
Benzo(b)fluoranthene	330	U	330	U
Benzo(k)fluoranthene	330	U	330	U
Benzo(a)pyrene	330	U	330	U
Indeno(1,2,3-cd)pyrene	330	U	330	U
Dibenz(a,h)anthracene	330	U	330	U
Benzo(g,h,i)perylene	330	U	330	U

(1) - Cannot be separated from Diphenylamine. *= Outside of EPA CLP QC limits.

000020

0.7

2/10/2

	Cust ID:	B0WBR8	B0WBR8	B0WBR8	B0WBR5	B0WBR6	B0WBR7
Sample Information	RFW#:	001	001 MS	001 MSD	002	003	004
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate Recovery	Nitrobenzene-d5	65 %	71 %	71 %	84 %	74 %	83 %
	2-Fluorobiphenyl	64 %	63 %	60 %	72 %	70 %	75 %
	Terphenyl-d14	72 %	71 %	63 %	80 %	74 %	79 %
	Phenol-d5	59 %	58 %	54 %	66 %	59 %	70 %
	2-Fluorophenol	53 %	55 %	54 %	63 %	53 %	65 %
	2,4,6-Tribromophenol	56 %	59 %	57 %	61 %	53 %	67 %
		fl	fl	fl	fl	fl	fl
Phenol		370 U J	58 %	51 %	340 U J	350 U J	350 U J
bis(2-Chloroethyl)ether		370 U	370 U	370 U	340 U	350 U	350 U
2-Chlorophenol		370 U	53 %	53 %	340 U	350 U	350 U
1,3-Dichlorobenzene		370 U	370 U	370 U	340 U	350 U	350 U
1,4-Dichlorobenzene		370 U	63 %	60 %	340 U	350 U	350 U
1,2-Dichlorobenzene		370 U	370 U	370 U	340 U	350 U	350 U
2-Methylphenol		370 U	370 U	370 U	340 U	350 U	350 U
2,2'-oxybis(1-Chloropropane)		370 U	370 U	370 U	340 U	350 U	350 U
4-Methylphenol		370 U J	370 U	370 U	340 U J	350 U J	350 U J
N-Nitroso-di-n-propylamine		370 U	88 %	95 %	340 U	350 U	350 U
Hexachloroethane		370 U J	370 U	370 U	340 U J	350 U J	350 U J
Nitrobenzene		370 U	370 U	370 U	340 U	350 U	350 U
Isophorone		370 U J	370 U	370 U	340 U J	350 U J	350 U J
2-Nitrophenol		370 U	370 U	370 U	340 U	350 U	350 U
2,4-Dimethylphenol		370 U	370 U	370 U	340 U	350 U	350 U
bis(2-Chloroethoxy)methane		370 U	370 U	370 U	340 U	350 U	350 U
2,4-Dichlorophenol		370 U	370 U	370 U	340 U	350 U	350 U
1,2,4-Trichlorobenzene		370 U J	65 %	63 %	340 U J	350 U J	350 U J
Naphthalene		370 U J	370 U	370 U	340 U J	350 U J	350 U J
4-Chloroaniline		370 U	370 U	370 U	340 U	350 U	350 U
Hexachlorobutadiene		370 U J	370 U	370 U	340 U J	350 U J	350 U J
4-Chloro-3-methylphenol		370 U J	61 %	60 %	340 U J	350 U J	350 U J
2-Methylnaphthalene		370 U	370 U	370 U	340 U	350 U	350 U
Hexachlorocyclopentadiene		370 U J	370 U	370 U	340 U J	350 U J	350 U J
2,4,6-Trichlorophenol		370 U J	370 U	370 U	340 U J	350 U J	350 U J
2,4,5-Trichlorophenol		920 U J	920 U	920 U	850 U J	880 U J	870 U J

*= Outside of EPA CLP QC limits.

000021

RFW Batch Number: 9909L127 Client: TNU-HANFORD B99-078 Work Order: 10985001001 Page: 1b

	Cust ID:	B0WBR8		B0WBR8		B0WBR8		B0WBR5		B0WBR6		B0WBR7	
	RFW#:	001		001 MS		001 MSD		002		003		004	
2-Chloronaphthalene		370	UJ	370	U	370	U	340	UJ	350	UJ	350	UJ
2-Nitroaniline		920	U	920	U	920	U	850	U	880	U	870	U
Dimethylphthalate		370	UJ	370	U	370	U	340	UJ	350	UJ	350	UJ
Acenaphthylene		370	UJ	370	U	370	U	340	UJ	350	UJ	350	UJ
2,6-Dinitrotoluene		370	U	370	U	370	U	340	U	350	U	350	U
3-Nitroaniline		920	U	920	U	920	U	850	U	880	U	870	U
Acenaphthene		370	UJ	65	%	64	%	340	UJ	350	UJ	350	UJ
2,4-Dinitrophenol		920	UJ	920	U	920	U	850	UJ	880	UJ	870	UJ
4-Nitrophenol		920	UJ	48	%	57	%	850	UJ	880	UJ	870	UJ
Dibenzofuran		370	U	370	U	370	U	340	U	350	U	350	U
2,4-Dinitrotoluene		370	U	71	%	76	%	340	U	350	U	350	U
Diethylphthalate		370	U	370	U	370	U	340	U	350	U	350	U
4-Chlorophenyl-phenylether		370	UJ	370	U	370	U	340	UJ	350	UJ	350	UJ
Fluorene		370	UJ	370	U	370	U	340	UJ	350	UJ	350	UJ
4-Nitroaniline		920	U	920	U	920	U	850	U	880	U	870	U
4,6-Dinitro-2-methylphenol		920	U	920	U	920	U	850	U	880	U	870	U
N-Nitrosodiphenylamine (1)		370	U	370	U	370	U	340	U	350	U	350	U
4-Bromophenyl-phenylether		370	UJ	370	U	370	U	340	UJ	350	UJ	350	UJ
Hexachlorobenzene		370	UJ	370	U	370	U	340	UJ	350	UJ	350	UJ
Pentachlorophenol		920	UJ	56	%	55	%	850	UJ	880	UJ	870	UJ
Phenanthrene		370	UJ	370	U	370	U	340	UJ	350	UJ	350	UJ
Anthracene		370	UJ	370	U	370	U	340	UJ	350	UJ	350	UJ
Carbazole		370	U	370	U	370	U	340	U*	350	U*	350	U*
Di-n-butylphthalate		370	UJ	370	U	370	U	18	J	350	UJ	350	UJ
Fluoranthene		370	UJ	370	U	370	U	340	UJ	350	UJ	350	UJ
Pyrene		370	UJ	76	%	66	%	340	UJ	350	UJ	350	UJ
Butylbenzylphthalate		370	UJ	370	U	370	U	340	UJ	350	UJ	350	UJ
3,3'-Dichlorobenzidine		370	U	370	U	370	U	340	U	350	U	350	U
Benzo(a)anthracene		370	UJ	370	U	370	U	340	UJ	350	UJ	350	UJ
Chrysene		370	UJ	370	U	370	U	340	UJ	350	UJ	350	UJ
bis(2-Ethylhexyl)phthalate		370	UJ	370	U	370	U	340	UJ	350	UJ	350	UJ
Di-n-octyl phthalate		370	UJ	370	U	370	U	340	UJ	350	UJ	350	UJ
Benzo(b)fluoranthene		370	UJ	370	U	370	U	340	UJ	350	UJ	350	UJ
Benzo(k)fluoranthene		370	UJ	370	U	370	U	340	UJ	350	UJ	350	UJ
Benzo(a)pyrene		370	UJ	370	U	370	U	340	UJ	350	UJ	350	UJ
Indeno(1,2,3-cd)pyrene		370	UJ	370	U	370	U	340	UJ	350	UJ	350	UJ
Dibenz(a,h)anthracene		370	U	370	U	370	U	340	U	350	U	350	U
Benzo(g,h,i)perylene		370	UJ	370	U	370	U	340	UJ	350	UJ	350	UJ

(1) - Cannot be separated from Diphenylamine. *= Outside of EPA CLP QC limits.

		Cust ID:	SBLKCZ		SBLKCZ BS	
Sample Information		RFW#:	99LE1143-MB1		99LE1143-MB1	
		Matrix:	SOIL		SOIL	
		D.F.:	1.00		1.00	
		Units:	UG/KG		UG/KG	
Surrogate Recovery	Nitrobenzene-d5		96	%	92	%
	2-Fluorobiphenyl		81	%	71	%
	Terphenyl-d14		88	%	76	%
	Phenol-d5		74	%	66	%
	2-Fluorophenol		68	%	67	%
	2,4,6-Tribromophenol		74	%	70	%
Phenol			330	U	61	%
bis(2-Chloroethyl)ether			330	U	330	U
2-Chlorophenol			330	U	62	%
1,3-Dichlorobenzene			330	U	330	U
1,4-Dichlorobenzene			330	U	75	%
1,2-Dichlorobenzene			330	U	330	U
2-Methylphenol			330	U	330	U
2,2'-oxybis(1-Chloropropane)			330	U	330	U
4-Methylphenol			330	U	330	U
N-Nitroso-di-n-propylamine			330	U	120	%
Hexachloroethane			330	U	330	U
Nitrobenzene			330	U	330	U
Isophorone			330	U	330	U
2-Nitrophenol			330	U	330	U
2,4-Dimethylphenol			330	U	330	U
bis(2-Chloroethoxy)methane			330	U	330	U
2,4-Dichlorophenol			330	U	330	U
1,2,4-Trichlorobenzene			330	U	80	%
Naphthalene			330	U	330	U
4-Chloroaniline			330	U	330	U
Hexachlorobutadiene			330	U	330	U
4-Chloro-3-methylphenol			330	U	74	%
2-Methylnaphthalene			330	U	330	U
Hexachlorocyclopentadiene			330	U	330	U
2,4,6-Trichlorophenol			330	U	330	U
2,4,5-Trichlorophenol			840	U	840	U

*= Outside of EPA CLP QC limits.

RL 2/11/00

000023

Cust ID: SBLKCZ SBLKCZ BS

RFW#: 99LE1143-MB1 99LE1143-MB1

2-Chloronaphthalene	330	U	330	U
2-Nitroaniline	840	U	840	U
Dimethylphthalate	330	U	330	U
Acenaphthylene	330	U	330	U
2,6-Dinitrotoluene	330	U	330	U
3-Nitroaniline	840	U	840	U
Acenaphthene	330	U	75	%
2,4-Dinitrophenol	840	U	840	U
4-Nitrophenol	840	U	74	%
Dibenzofuran	330	U	330	U
2,4-Dinitrotoluene	330	U	91 *	%
Diethylphthalate	330	U	330	U
4-Chlorophenyl-phenylether	330	U	330	U
Fluorene	330	U	330	U
4-Nitroaniline	840	U	840	U
4,6-Dinitro-2-methylphenol	840	U	840	U
N-Nitrosodiphenylamine (1)	330	U	330	U
4-Bromophenyl-phenylether	330	U	330	U
Hexachlorobenzene	330	U	330	U
Pentachlorophenol	840	U	69	%
Phenanthrene	330	U	330	U
Anthracene	330	U	330	U
Carbazole	330	U	330	U
Di-n-butylphthalate	330	U	330	U
Fluoranthene	330	U	330	U
Pyrene	330	U	79	%
Butylbenzylphthalate	330	U	330	U
3,3'-Dichlorobenzidine	330	U	330	U
Benzo(a)anthracene	330	U	330	U
Chrysene	330	U	330	U
bis(2-Ethylhexyl)phthalate	330	U	330	U
Di-n-octyl phthalate	330	U	330	U
Benzo(b)fluoranthene	330	U	330	U
Benzo(k)fluoranthene	330	U	330	U
Benzo(a)pyrene	330	U	330	U
Indeno(1,2,3-cd)pyrene	330	U	330	U
Dibenz(a,h)anthracene	330	U	330	U
Benzo(g,h,i)perylene	330	U	330	U

(1) - Cannot be separated from Diphenylamine. *= Outside of EPA CLP QC limits.

2/10/00

000024

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

RECRA ENVIRONMENTAL INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report
****REVISION****

Client : TNU-HANFORD B99-078
RFW# : 9909L127
SDG/SAF #: H0534/B99-078

W.O. #: 10985 001 001 9999 00
Date Received: 09-17-99

SEMIVOLATILE

This narrative was corrected to add the TIC search for Tributylphosphate.

Four (4) soil samples were collected on 09-15-99.

The samples and their associated QC samples were extracted on 09-20-99 and analyzed according to criteria set forth in Recra OPs based on SW 846 Methods 8270B for TCL Semivolatile target compounds on 09-28-99.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. The cooler temperature upon receipt has been recorded on the chain-of-custody.
2. The required holding times for extraction and analysis were met.
3. A non-target compound was detected in sample B0WBR8.
4. All surrogate recoveries were within EPA QC limits.
5. All matrix spike recoveries were within EPA QC limits.
6. One (1) of eleven (11) blank spike recoveries was outside EPA QC limits.
7. These samples were spectrally searched for Butylated Hydroxytoluene and Tributylphosphate; however, they were not identified in the samples.

by _____ 09-27-99

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

Date

[illegible]

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report
****REVISION****

Client : TNU-HANFORD B99-078
RFW# : 9909L129
SDG/SAF #: H0534/B99-078

W.O. #: 10985-001-001-9999-00
Date Received: 09-17-99

SEMIVOLATILE

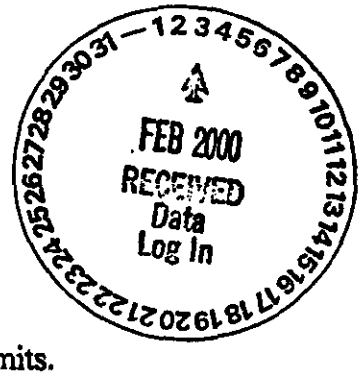
This narrative was corrected to add the TIC search for Tributylphosphate.

Four (4) soil samples were collected on 09-14-99.

The samples and their associated QC samples were extracted on 09-20-99 and analyzed according to criteria set forth in Recra OPs based on SW 846 Methods 8270B for TCL Semivolatile target compounds on 09-28,29,30-99.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. The cooler temperature upon receipt has been recorded on the chain-of-custody.
2. The required holding times for extraction and analysis were met.
3. Non-target compounds were detected in the samples.
4. All surrogate recoveries were within EPA QC limits.
5. All matrix spike recoveries were within EPA QC limits.
6. One (1) of eleven (11) blank spike recoveries was outside EPA QC limits.
7. These samples were spectrally searched for Butylated Hydroxytoluene and Tributylphosphate; however, they were not identified in the samples.



By _____ 01-27-00
J. Michael Taylor — Date
Vice President
Philadelphia Analytical Laboratory

pef\gorup\data\bna\mu09129.doc

208 Welsh Pool Road • Lionville, PA 19341-1333 • (610) 280-3000 • Fax (610) 280-3041

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-121	Page 1 of 1

Collector Bowers/Trice	**Company Contact** Chris Cearlock **Telephone No.** 372-9574	**Project Coordinator** TRENT, SJ	**Price Code** 8N **Data Turnaround** 45 Days
Project Designation 200 Area Source characterization - 200-CW-1 OU	**Sampling Location** 200 B pond (B8758) >15'	**SAF No.** B99-078	
Ice Chest No. ERC 96 024	**Field Logbook No.** EL-1511	**Method of Shipment** Fed Ex	
Shipped To TMA/RECRA	**Offsite Property No.** A990259	**Bill of Lading/Air Bill No.** 423579529561	
SJB 9-15-99		**COA** B20CW167IC	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Sample No.	Matrix *	Sample Date	Sample Time	Preservation: Cool 4C	Cool 4C	None	Cool 4C						
				Type of Container: aG	aG	aG	aG						
				No. of Container(s): 1 / Volume: 60mL	1 / 250mL	1 / 250mL	1 / 500mL						
				SAMPLE ANALYSIS: VOA - 8260A (TCL); VOA - 8260A (Add-On) [1-Propanol, Ethanol]	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.						
B0WBR8	Soil	9.15.99	0945	X	X		X			BOWCA1			
B0WBR9	Soil		9/5/99										
B0WBT0	Soil		9/6/99										
B0WBT1	Soil		CT 9/15/99										

000028

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: [signature]	Date/Time: 9/15/99 1530	Received By: Ref IB	Date/Time: 9/15/99 1530
Relinquished By: Ref IB	Date/Time: 91699 1300	Received By: SIGALE [signature]	Date/Time: 91699 1300
Relinquished By: SIGALE [signature]	Date/Time: 91699 1300	Received By: FED EX	Date/Time:
Relinquished By: Fed Ex	Date/Time: 9-17-99 1020	Received By: TJ Murray	Date/Time: 9-17-99 1020

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078. Out of Gamma Spec. bottle also analyze for Np-237, isotopic U, Ni-63, Tech-99, Tritium, . Out of ICP bottle also analyze for NO2/NO3, IC anions, Sulfides, Ammonia, Total Cyanide, and pH.

(1) Gamma Spectroscopy [Cesium-137, Cobalt-60, Europium-152, Europium-155]; Gamma Spec - Add-on [Americium-241]; Strontium-89,90 -- Total Sr; Total Uranium [Uranium]; Isotopic Plutonium; Isotopic Thorium [Thorium-232]; Americium-241
(2) ICP Metals - 6010A (Supertrace) [Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver]; ICP Metals - 6010A (Supertrace Add-On) [Beryllium, Copper, Nickel, Vanadium, Zinc]; Mercury - 7471 - (CV); Chromium Hex - 7196

COLLECTOR UNAVAILABLE TO SIGN COC

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-120	Page 1 of 1 2

Collector Bowers/Trice	Company Contact Chris Cearlock	Telephone No. 372-9574	Project Coordinator TRENT, SJ
Project Designation 200 Area Source characterization - 200-CW-1 OU	Sampling Location 200 Bpond (B8758) <15'		SAF No. B99-078
Ice Chest No. ERC96 024	Field Logbook No. EL-1511		Method of Shipment Fed Ex
Shipped To TMA/RECRA	Offsite Property No. A990259		Bill of Lading/Air Bill No. 423579529561
			COA B20CW1 671C

Price Code 8N

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	None	Cool 4C	None
Type of Container	aG	aG	aG	aG	P
No. of Container(s)	1	1	1	1	1
Volume	60mL	250mL	250mL	500mL	plastic bag
SAMPLE ANALYSIS	VOA - 8260A (TCL); VOA - 8260A (Add-On) {1-Propanol, Ethanol}	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.	Particle size

Sample No.	Matrix *	Sample Date	Sample Time										
B0WBR4 DJB 9-15-99	Soil												
B0WBR5	Soil	9-15-99	0739	X	X		X				BOWCR1		
B0WBR6	Soil	9-15-99	0834	X	X		X	~~X~~ 9/16/99			BOWCR1		
B0WBR7	Soil	9-15-99	0834	X	X		X				BOWCR1		

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By	Date/Time	Received By	Date/Time
CMc	9/15/99 1530	RJ IB	9/15/99 1530
REF IB	91699 1300	SJ Gales	91699 1300
SJGales	91699 1300	FED EX	
Fed Ex	9-17-99 1020	TMurrey	9-17-99 1020

SPECIAL INSTRUCTIONS
See chain of custody comments on SAF B99-078. Out of Gamma Spec. bottle also analyze for Np-237, isotopic U, . Out of ICP bottle also analyze for NO2/NO3, IC anions, Sulfides, Ammonia, Total Cyanide, and pH.

(1) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-155}; Gamma Spec - Add-on {Americium-241}; Strontium-89,90 -- Total Sr; Total Uranium {Uranium}; Isotopic Plutonium; Isotopic Thorium {Thorium-232}; Americium-241
(2) ICP Metals - 6010A (Supertrace) {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; ICP Metals - 6010A (Supertrace Add-On) {Beryllium, Copper, Nickel, Vanadium, Zinc}; Mercury - 7471 - (CV); Chromium Hex - 7196

COLLECTOR UNAVAILABLE TO SIGN COC

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

0000029

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-119	Page 1 of 1

Collector Bowers/Trice	**Company Contact** Chris Cearlock **Telephone No.** 372-9574	**Project Coordinator** TRENT, SJ	**Price Code** 8N **Data Turnaround** 45 Days
Project Designation 200 Area Source characterization - 200-CW-1 OU	**Sampling Location** 200 Bpond (B8758) <15'	**SAF No.** B99-078	
Ice Chest No. ERC 96 065	**Field Logbook No.** EL-1511	**Method of Shipment** Fed Ex	
Shipped To TMA/RECRA 9-14-99	**Offsite Property No.** A990257	**Bill of Lading/Air Bill No.** 112357952950	
		COA 0200W1 67IC	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	Cool 4C	Cool 4C	None	Cool 4C								
Type of Container	aG	aG	aG	aG								
No. of Container(s)	1	1	1	1								
Volume	60mL	250mL	250mL	500mL								
SAMPLE ANALYSIS	VOA - 8260A (TCL); VOA - 8260A (Add-On) [1-Propanol, Ethanol]	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.								

Sample No.	Matrix *	Sample Date	Sample Time										
B0WBR0	Soil	9.14.99	1216	X	X		X		BOWCRO				
B0WBR1	Soil	9.14.99	1300	X	X		X		BOWCRO				
B0WBR2	Soil	9.14.99	1340	X	X		X		BOWCRO				
B0WBR3 9.14.99 a	Soil												
BOWBR4	S-I)	9.14.99	1510	X	X		X		BOWCRO				

0000030

CHAIN OF POSSESSION — **Sign/Print Names**

	Relinquished By	Date/Time	Received By	Date/Time
1	Doug Bowers Doug Bowers	9-17-99/1700	B. F IB	9-17-99/1700
2	Peter IB	9/16/99 11:30	Brent Porter	9/16/99 11:30
3	Brent Porter	9/16/99 11:30	Fed Express	9/16/99 11:30
4	Fed Ex EE	9-17-99 :0245	Vicki Kemp	9-17-99 0245

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078. Out of Gamma Spec. bottle also analyze for Np-237, isotopic U, . Out of ICP bottle also analyze for NO2/NO3, IC anions, Sulfides, Ammonia, Total Cyanide, and pH.

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 -- Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241
(2) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Beryllium, Copper, Nickel, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

Collector coordinate to sign COC

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

LABORATORY SECTION	**Received By**	**Title**	**Date/Time**
FINAL SAMPLE DISPOSITION	**Disposal Method**	**Disposed By**	**Date/Time**

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 200-CW-1			DATA PACKAGE: H0534		
VALIDATOR: HCI		LAB: RECRA		DATE: ~~12/20~~ 2/16/00	
CASE:			SDG: H0534		

ANALYSES PERFORMED

☐ CLP Volatiles	☐ SW-846 8240 (cap column)	☐ SW-846 8260 (packed column)	☐ CLP Semivolatiles	☒ SW-846 8270 (cap column)	☐ SW-846 (packed column)
☐	☐	☐	☐	☐	☐

SAMPLES/MATRIX BOWBR0 BOWBR1 BOWBR2 BOWBR4
BOWBR5 BOWBR6 BOWBR7 BOWBR8

saf

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . Yes No (N/A)

Is a case narrative present? . . . . . (Yes) No N/A

Comments: _____

2. HOLDING TIMES

Are sample holding times acceptable? . . . . . (Yes) No N/A

Comments: _____

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. INSTRUMENT TUNING AND CALIBRATION

Is the GC/MS tuning/performance check acceptable?	Yes	No	N/A
Are initial calibrations acceptable?	Yes	No	N/A
Are continuing calibrations acceptable?	Yes	No	N/A

Comments:

4. BLANKS

Were laboratory blanks analyzed?	Yes	No	N/A
Are laboratory blank results acceptable?	Yes	No	N/A
Were field/trip blanks analyzed?	Yes	No	N/A
Are field/trip blank results acceptable?	Yes	No	N/A

Comments:

5. ACCURACY

Were surrogates/System Monitoring Compounds analyzed?	Yes	No	N/A
Are surrogate/System Monitoring Compound recoveries acceptable?	Yes	No	N/A
Were MS/MSD samples analyzed?	Yes	No	N/A
Are MS/MSD results acceptable?	Yes	No	N/A

Comments: 7 over — Jall 1-4
9 over — Jall 5-8

GC/MS ORGANIC DATA VALIDATION CHECKLIST

6. PRECISION

Are MS/MSD RPD values acceptable? . . . . . Yes No N/A
Are field duplicate RPD values acceptable? . . . . . Yes No N/A
Are field split RPD values acceptable? . . . . . Yes No N/A
Comments:

7. SYSTEM PERFORMANCE

Were internal standards analyzed? . . . . . Yes No N/A
Are internal standard areas acceptable? . . . . . Yes No N/A
Are internal standard retention times acceptable? . . . . . Yes No N/A
Comments:

8. COMPOUND IDENTIFICATION AND QUANTITATION

Is compound identification acceptable? . . . . . Yes No N/A
Is compound quantitation acceptable? . . . . . Yes No N/A
Comments:

9. REPORTED RESULTS AND QUANTITATION LIMITS

Are results reported for all requested analyses? . . . . . Yes No N/A
Are all results supported in the raw data? . . . . . Yes No N/A
Do results meet the CRQLs? . . . . . Yes No N/A
Has the laboratory properly identified and coded all TIC? . . . Yes No N/A
Comments: all samples + analytes

Review Comment Record (RCR)

1. Date	2. Review No.
2/03/00	BHI/QA0014
3. Project	4. Page
200-CW-1	Page 1 of 3

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
SDG No. H0534	200 Area Source Characterization – 200-CW-1 Operable Unit	Claude Stacey	BHI/QA	H0-16/372-9208

10. Comment Submittal Approval: _____ Organization Manager (Optional) _____ Date

10. Agreement with indicated comment disposition(s): _____ Reviewer/Point of Contact _____ Date _____ Author/Originator

11. CLOSED: Feb. 25, '00 Claude Stacey Reviewer/Point of Contact _____ Author/Originator

12 Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
✓	General Comment: None of the packages had the supporting documentation for the qualifiers. The validation procedures calls to include submittal of copies data validation supporting documentation as part of the validation package. This would include missed hold time information, out of criteria matrix spike, duplication data, LCS data, etc.		In most cases the blank + MS/MSD is included on the Form I's. In other cases the appropriate information has been added	
✓	PCB: Page 010, indicates the CRDL to be 0.1 with the heading indicating the units to be UG/KG. The CRDL for PCB should be 100 UG/KG. This would also change the conclusion that the laboratory exceeded the detection limits on page 004.		Corrected	
✓2	PCB: The accuracy and precision acceptance criteria do not reflect project requirements as specified in DOE/RL 99-07.		Corrected per new guidelines	
✓3	Radiochemistry: Page 002, Accuracy specifies the matrix spike recovery range is 70 to 130%. This should read matrix spike recovery range is 70 to 130% or 80 to 120%, since the isotopes determined by GeLi/HPGe recovery range is 80 to 120 % as specified in the project documents.		Corrected per new guidelines	
✓4	Radiochemistry: Page 003, Precision indicates acceptable RPD to be 35%; whereas, project documents has acceptance for precision to be 30%.		corrected per new guidelines	
✓5	Radiochemistry: page 010 needs a statement at bottom data indicating that Total U is in MG/KG.		Corrected	

Review Comment Record (RCR)

1. Date	2. Review No.
2/03/00	BHI/QA0014
3. Project	**4. Page**
200-CW-1	Page 2 of 3

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Statu
6	Radiochemistry: Page 11 the required detection limits for Co-60, Eu-152 and 154 are in different then those specified by the project. Co-60 should be 0.1, Eu-152 and 154 should be 0.2. With these changes the isotopes listed on pages 004 will need reviewed.		Corrected per new guidelines	
7	Radiochemistry: Page 001 states the validation was conducted in accordance to document DOE/RL 98-47 draft B. The reference document should be DOE/RL 99-87 draft B.		Corrected per new guidelines	
8	Wet Chemistry: Again the accuracy and precision acceptance criteria do not reflect project requirements.		Corrected per new guidelines	
9	Wet Chemistry: Page 10 the header at the top of the page states that these are water samples and the results are in MG/L. The samples are soil and the results are in MG/KG.		Corrected	
10	Wet Chemistry: Page 010 does not indicate a CRDL for Cr-VI. Project PQL for Cr-VI is 0.7 MG/KG.		Corrected per new guidelines	
11	Volatiles: Again the accuracy and precision acceptance criteria do not reflect project requirements.		Corrected per new guidelines	
12	Volatiles: The detection limits listed on page 011 do not meet the project PQL on the majority of the compounds.		Corrected per new guidelines	
13	Semi-Volatiles: Again the accuracy and precision acceptance criteria do not reflect project requirements.		Corrected per new guidelines	
14	Semi-Volatiles: Project documents call for the determination of tri-butyl phosphate; however, it was no analyzed for by the laboratory and no mention of the lack of tri-butyl phosphate in the validation package.		R. Wiess Resolution	
15	Semi-Volatiles: Page 011 for SDG in the header has H0506, this should be H0534. Also on the same page, Chrysene has an * after it; however, there is nothing that indicates what the * is referring to.		Correct	
16	Inorganics: Again the accuracy and precision acceptance criteria do not reflect project requirements. Using the project acceptance criteria for MS recovery the lead results that have been qualified "J" due to low MS recovery would not require the qualification.		Corrected per new guidelines	
17	Inorganics: Page 010 the heading at the top of the page indicates the units			

Review Comment Record (RCR)

1. Date	2. Review No.
2/03/00	BHI/QA0014
3. Project	**4. Page**
200-CW-1	Page 3 of 3

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
	for the data is in UG/KG; whereas, the laboratory data sheets indicate the data is in MG/KG.		Corrected	
18	Inorganic: Page 010 most of the CRDL listed are not what the project required.		corrected per new guidlines	
✓	It would appear that the validator either do not have the project specific data requirements or the wrong project data requirements were used for the validation.		New guidelines were submitted + the data revalidated.	

Validation Package Review – 200-CW-1 Packages - RL Weiss

Package H0509 – No comments

Package H0534 – No comments

Package H0590 – No comments except

Semivolatile, Pg. 4 & 5, "Analytical Detection Levels"; Wording should be that all non-detects failed to meet detection limits specified by the CRDL. See wording in similar sections of H0506 & H0534.

already corrected - corrections on

RAW 3/10/3000

Review Comment Record (RCR)

1. Date	2. Review No.
2/03/00	BHI/QA0014
3. Project	4. Page
200-CW-1	Page 1 of 3

5. Document Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
SDG No. H0534	200 Area Source Characterization – 200-CW-1 Operable Unit	Claude Stacey	BHI/QA	H0-16/372-9208

10. Comment Submittal Approval: 10. Agreement with indicated comment disposition(s) 11. CLOSED

Organization Manager (Optional) Date Reviewer/Point of Contact Date Reviewer/Point of Contact

Author/Originator Author/Originator

12 Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
	General Comment: None of the packages had the supporting documentation for the qualifiers. The validation procedures calls to include submittal of copies data validation supporting documentation as part of the validation package. This would include missed hold time information, out of criteria matrix spike, duplication data, LCS data, etc.		In most cases the blank + MS/MSD is included on the Form I's. In other cases the appropriate information has been added	
	PCB: Page 010, indicates the CRDL to be 0.1 with the heading indicating the units to be UG/KG. The CRDL for PCB should be 100 UG/KG. This would also change the conclusion that the laboratory exceeded the detection limits on page 004.		Corrected	
2	PCB: The accuracy and precision acceptance criteria do not reflect project requirements as specified in DOE/RL 99-07.		Corrected per new guidelines	
3	Radiochemistry: Page 002, Accuracy specifies the matrix spike recovery range is 70 to 130%. This should read matrix spike recovery range is 70 to 130% or 80 to 120%, since the isotopes determined by GeLi/HPGe recovery range is 80 to 120 % as specified in the project documents.		Corrected per new guidelines	
4	Radiochemistry: Page 003, Precision indicates acceptable RPD to be 35%; whereas, project documents has acceptance for precision to be 30%.		Corrected per new guidelines	
5	Radiochemistry: page 010 needs a statement at bottom data indicating that Total U is in MG/KG.		Corrected	

Review Comment Record (RCR)

1. Date	2. Review No.
2/03/00	BHI/QA0014
3. Project	**4. Page**
200-CW-1	Page 2 of 3

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Statu
6	Radiochemistry: Page 11 the required detection limits for Co-60, Eu-152 and 154 are in different then those specified by the project. Co-60 should be 0.1, Eu-152 and 154 should be 0.2. With these changes the isotopes listed on pages 004 will need reviewed.		Corrected per new guidelines	
7	Radiochemistry: Page 001 states the validation was conducted in accordance to document DOE/RL 98-47 draft B. The reference document should be DOE/RL 99-07 draft B.		Corrected per new guidelines	
8	Wet Chemistry: Again the accuracy and precision acceptance criteria do not reflect project requirements.		Corrected per new guidelines	
9	Wet Chemistry: Page 10 the header at the top of the page states that these are water samples and the results are in MG/L. The samples are soil and the results are in MG/KG.		Corrected	
10	Wet Chemistry: Page 010 does not indicate a CRDL for Cr-VI. Project PQL for Cr-VI is 0.7 MG/KG.		Corrected per new guidelines	
11	Volatiles: Again the accuracy and precision acceptance criteria do not reflect project requirements.		Corrected per new guidelines	
12	Volatiles: The detection limits listed on page 011 do not meet the project PQL on the majority of the compounds.		Corrected per new guidelines	
13	Semi-Volatiles: Again the accuracy and precision acceptance criteria do not reflect project requirements.		Corrected per new guidelines	
14	Semi-Volatiles: Project documents call for the determination of tri-butyl phosphate; however, it was no analyzed for by the laboratory and no mention of the lack of tri-butyl phosphate in the validation package.		R. Wiess Resolution	
15	Semi-Volatiles: Page 011 for SDG in the header has H0506, this should be H0534. Also on the same page, Chrysene has an * after it; however, there is nothing that indicates what the * is referring to.		Corrected	
16	Inorganics: Again the accuracy and precision acceptance criteria do not reflect project requirements. Using the project acceptance criteria for MS recovery the lead results that have been qualified "J" due to low MS recovery would not require the qualification.		Corrected per new guidelines	
17	Inorganics: Page 010 the heading at the top of the page indicates the units			

Review Comment Record (RCR)

1. Date	2. Review No.
2/03/00	BHI/QA0014
3. Project	**4. Page**
200-CW-1	Page 3 of 3

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Statu
	for the data is in UG/KG; whereas, the laboratory data sheets indicate the data is in MG/KG.		Corrected	
18	Inorganic: Page 010 most of the CRDL listed are not what the project required.		corrected per new guidlines	
	It would appear that the validator either do not have the project specific data requirements or the wrong project data requirements were used for the validation.		New guidelines were submitted + the data revalidated.	

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report
****REVISION****

Client: TNU HANFORD B99-078
RFW #: 9909L127
SDG/SAF#: H0534/B99-078

W.O. #: #: 10985-001-001-9999-00
Date Received: 09-17-99

GC SCAN

This narrative was revised to remove references to Butanol and add references to 1-Propanol and to clarify surrogate information.

The set of samples consisted of four (4) soil samples collected on 09-15-99.

The samples and their associated QC samples were prepared on 09-23-99 and analyzed by methodology based on EPA Method 8015B for Ethanol and 1-Propanol on 09-24-99.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. The samples were packaged and stored as specified in the method protocol; the cooler temperature upon receipt has been recorded on the chain-of-custody.

2. The required holding time for analysis was met.

3. All initial calibrations associated with this data set were within acceptance criteria.

4. All continuing calibration standards analyzed prior to the sample extracts were within acceptance criteria.

5. Recra does not use surrogate spikes for this analysis. The method does not provide specific guidance regarding the use of surrogates and performance criteria. Method performance is monitored through the use of blank spikes and matrix spikes.

6. The blank spike recovery was within advisory control limits of 50%-150%.

7. All matrix spike recoveries were within advisory control limits of 50%-150%.

By _____ 01-07-00
J. Michael Taylor — Date
Vice President
Philadelphia Analytical Laboratory

r:\share\lc\gcscan\09-127.doc

FAX

TECHLAW, INC.
451 Hills, Suite 23
Richland, WA 99352
509-375-5667
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 5 January 2000

Information Request

H0534 - Rad

Due to the blank analysis being conducted 5 days after the SDG, all isotopic thorium results will be qualified as estimates and flagged "J".

Due to all QC samples being prepared 4 days after the SDG, all neptunium-237 results will be qualified as estimates and flagged "J".

Proceed with validation
R2 Mw 1-5-00

FAX

TECHLAW, INC.
451 Hills, Suite 23
Richland, WA 99352
509-375-5667
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 5 January 2000

Information Request

110534 - Wet Chem

The chain of custodies included in the wet chem package do not list wet chem as a requested analysis.

Please note "Special Instructions" section of COC. Validate as normal

BZ Wen 1-5-00

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-078-119	Page 1 of 1

Collector Bowers/Trice	**Company Contact** Chris Cearlock **Telephone No.** 372-9574	**Project Coordinator** TRENT, SJ	**Price Code** 8N **Data Turnaround** 45 Days 030
Project Designation 200 Area Source characterization - 200-CW-1 OU	**Sampling Location** 200 Bpond (B8758) <15'	**SAF No.** B99-078	
Ice Chest No. ERC 96 065	**Field Logbook No.** EL-1511	**Method of Shipment** Fed Ex	
Shipped To TMA/RECRA 9-14-99	**Offsite Property No.** A990257	**Bill of Lading/Air Bill No.** 423579529550	
		COA 920CW1 671C	

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	Cool 4C	Cool 4C	None	Cool 4C						
	Type of Container	aG	aG	aG	aG						
Special Handling and/or Storage	No. of Container(s)	1	1	1	1						
	Volume	60mL	250mL	250mL	500mL						
SAMPLE ANALYSIS		VOA - 8260A (TCL); VOA - 8260A (Add-On) (1-Propanol, Ethanol)	Semi-VOA - 8270A (TCL); TPH-Diesel Range - WTPH-D; PCBs - 8082	See item (1) in Special Instructions.	See item (2) in Special Instructions.						

Sample No.	Matrix *	Sample Date	Sample Time								
B0WBR0	Soil	9.14.99	1216	X	X		X		BOWCRO		
B0WBR1	Soil	9.14.99	1300	X	X		X		BOWCRO		
B0WBR2	Soil	9.14.99	1340	X	X		X		BOWCRO		
~~B0WBR3 9.14.99~~ C	Soil										
BOWBR4	S-1)	9.14.99	1510	X	X		X		BOWCRO		

CHAIN OF POSSESSION	Sign/Print Names	Date/Time
Relinquished By	Doug Bowers	9-17-99/1700
Received By	R.F IB	9-17-99/1700
Relinquished By	Peter IB	9/16/99 11:30
Received By	Brent Porter	9/16/99 11:30
Relinquished By	Brent Porter	9/16/99 11:30
Received By	Fed Express	9/16/99 11:30
Relinquished By		9-17-99 :0245
Received By	Vicki Kenny	9-17-99 0245

SPECIAL INSTRUCTIONS

See chain of custody comments on SAF B99-078. Out of Gamma Spec. bottle also analyze for Np-237, isotopic U. Out of ICP bottle also analyze for NO2/NO3, IC anions, Sulfides, Ammonia, Total Cyanide, and pH.

(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-155); Gamma Spec - Add-on (Americium-241); Strontium-89,90 – Total Sr; Total Uranium (Uranium); Isotopic Plutonium; Isotopic Thorium (Thorium-232); Americium-241
(2) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver); ICP Metals - 6010A (Supertrace Add-On) (Beryllium, Copper, Nickel, Vanadium, Zinc); Mercury - 7471 - (CV); Chromium Hex - 7196

Collector unavailable to sign COC

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

Data Package	IR	
H0472	Rad MS *	
H0475	Rad MS *	
H0473	Rad MS *	
H0538	Rad MS *	
	Rad - New Form 1s list liquid versus solid matrix	
H0542	Rad MS *	
H0544	Rad MS *	
	Metals - Case narrative states that only 1 sample was	
	analyzed (two were analyzed)	
H0551	Rad MS *	
H0514	CR VI - Method of analysis not identified	
H0506	Samples not listed in VSR	
	Rad MS *	
	Alcohols - Surrogate not run?	
H0534	Samples not listed in VSR	
	Was nickel, 3H and TC-99 analysis to be conducted	
	on samples BR0, BR1, BR2, BR4?	
	Rad MS *	
	PCBs - What do you want for CRDLs	
	alcohols - no surrogate?	
	MS/MSD for VOA	

L BR0, BR1, BR2 + BR4 - Case narrative ~~gives~~ states that the associated MS/MSD is the one for the other samples in the SDG - But they were not run together.

Bruce
Proceed with validation for all "Rad MS" issues identified above (*) and with missing alcohol surrogates. (D) identified above

Rachael Weiss
1-4-20

FAX

TECHLAW, INC.

451 Hills, Suite 23
Richland, WA 99352
509-375-5667
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 20 December 1999

Information Request

H0534-Rad

No indication of a matrixspike foc 311 & C-14.

Rich

FAX

TECHLAW, INC.

451 Hills, Suite 23
Richland, WA 99352
509-375-5667
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 20 December 1999

Information Request

H0534 - VOA

The case narrative for samples B0WBR0, B0WBR1, B0WBR2 and B0WBR4 states that the MS/MSD is associated with a different lot number (the other samples in the SSD. This is unlikely since the analysis were conducted several days apart (see pages #11 and #13). Are the analysis dates wrong, or other MS/MSD data??

Bechtel Hanford, Inc.
3350 George Washington Way
Richland, WA 99352

Attn: BHI Sample Management
3190 George Washington Way
MSIN: H9-03
Phone: 375-9439
FAX: 372-9487

BHI Sample Management

Fax

To: Bruce Christian **From:** Jeanette Duncan

Fax: 375-5151 **Pages:** 3

Phone: **Date:** 12/20/99

Re: **CC:**

☐ Urgent ☐ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

• **Comments:**

Bruce — this should take care of the missing QC info from sample summary on H0506 + H0534. Let me know if it doesn't — Jeanette

Note - 100 sample taken at Gable Mt. Test Pits (need some additional QA/QC samples)

QA 1 in 20 or 5%
two collocates per waste site
one per borehole

Sample ID	Type	Location
B0W679	EQ	GP-3
B0W8W0	EQ	GP-8
B0W9P1	EQ	GP-12
B0WCP8	EQ	B8758
B0WLM4	EQ	BP-3
B0WLM3	EQ	BP-1
B0WNX3	EQ	TP-2
B0WNX1	EQ	TP-1
B0WNX7	EQ	BP-7
B0WNX9	EQ	BP-9
B0X487	EQ	B8757

Sample ID	Type	Location
B0W680	TB	GP-3
B0W8W1	TB	GP-8
B0W9P0	TB	GP-12
B0WCP9	TB	B8758
B0WLM5	TB	BP-3
B0WLM2	TB	BP-1
B0WNW6	TB	BP-7
B0WNW8	TB	BP-9
B0WNX0	TB	TP-1
B0WNX2	TB	TP-2
B0X3V9	TB	B8757

Sample ID	Type	Split of	Location
B0W5P8	SPLIT	B0W5P7	GP-3
B0W8B1	SPLIT	B0W894	GP-8
B0W9H9	SPLIT	B0W9K0	GP-12
B0WBR3	SPLIT	B0WBR2	B8758
B0WKVC	SPLIT	B0WKX1	BP-3
B0WKT9	SPLIT	B0WKV1	BP-1
B0WMM8	SPLIT	B0WMH1	TP-3
B0WMM6	SPLIT	B0WMD1	TP-1
B0WMM2	SPLIT	B0WMX1	BP-7

B0WMM4	SPLIT	B0WN01	BP-9
B0XN26	SPLIT	B0XN21	B8757

Sample ID	Type	Dup of	Location
B0W681 ✓	DUP	B0W5P7 ✓	GP-3
B0W895 ✓	DUP	B0W894 ✓	GP-8
B0W9K1 ✓	DUP	B0W9K0 ✓	GP-12
B0WBR7 ✓	DUP	B0WBR6 ✓	B8758
B0WKX2 ✓	DUP	B0WKX1 ✓	BP-1
B0WKV2 ✓	DUP	B0WKV1 ✓	BP-1
B0WMX2 ✓	DUP	B0WMH1 ✓	TP-3
B0WN02 ✓	DUP	B0WMD1 ✓	TP-1
B0WMD2 ✓	DUP	B0WMX1 ✓	BP-7
B0WMH2 ✓	DUP	B0WN01 ✓	BP-9
~~B0XN22~~ WN22	DUP	~~B0XN21~~ WN21	B8757

B0W5L6, 7

TRANSMISSION RESULT REPORT (DEC 20 '99 02:14PM)

BHI S&D MANAGEMENT 509 372 9487

(AUTO)

THE FOLLOWING FILE(S) ERASED

FILE	FILE TYPE	OPTION	TEL NO.	PAGE	RESULT
097	MEMORY TX		3755151	03/03	OK

ERRORS

1) HANG UP OR LINE FAIL 2) BUSY 3) NO ANSWER 4) NO FACSIMILE CONNECTION

Bechtel Hanford, Inc.
3350 George Washington Way
Richland, WA 99352

Attn: BHI Sample Management
3190 George Washington Way
MSIN: H9-03
Phone: 375-9439
FAX: 372-9487

BHI Sample Management

Fax

To: Bruce Christian From: Jeanette Duncan

Fax: 375-5151 Pages: 3

Phone: Date: 12/20/99

Re: CC:

☐ Please Comment ☐ Please Reply ☐ Please Recycle

Duncan, Jeanette M

From: Kessner, Joan H
Sent: Wednesday, December 22, 1999 7:54 AM
To: 'orlette'
Cc: Duncan, Jeanette M
Subject: validation help

Orlette---
Good morning. I need some help answering our validators questions (usually Rich does this and knows if the requests make sense or not----so if the requests are of a "goat" nature just consider the source.....)

- H0544 (metals): The case narrative states incorrectly that only one sample was analyzed. Please correct the case narrative and resubmit. (One thing our other lab has started to do is put a revised call out in the case narrative discussing what change was made and why----is that something you could do when these kind of questions come up?? From our perspective it is really helpful.)
- H0506 (alcohols): No surrogate information is present. Were surrogates run? (Guidelines call for them.....this is what my validator thinks I don't have a clue.)
- H0534 (alcohols): No surrogate information is present.....
- H0534 (voa): The case narrative for samples B0WBR0, B0WBR2 and B0WBR4 states that the MS/MSD is associated with a different lot number (the other samples in the SDG). This is unlikely since the analysis were conducted several days apart (see pages 11 and 13). Are the analysis dates wrong or the other MS/MSD data?? I have not a clue about this.....

I hope this makes senses. Please let me know when you think we will get the answers.....
Have a great holiday!!
Joan

FAX

TECHLAW, INC.

451 Hills, Suite 23
Richland, WA 99352
509-375-5667
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 20 December 1999

Information Request

H0534 & 110505-PCB

What values do you want me to use for CRDLs??
No indication of a matrixspike foe 3H & C-14.

FAX

TECHLAW, INC.

451 Hills, Suite 23
Richland, WA 99352
509-375-5667
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 20 December 1999

Information Request

H0534 - Alcohols

No surrogate information is present. Were surrogates run? (Guidelines call for them)

FAX

TECHLAW, INC.

451 Hills, Suite 23
Richland, WA 99352
509-375-5667
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 20 December 1999

Information Request

H0534 - Alcohols

No surrogate information is present. Were surrogates run? (Guidelines call for them)

FAX

TECHLAW, INC.

451 Hills, Suite 23
Richland, WA 99352
509-375-5667
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 20 December 1999

Information Request

H0534 - VOA

The case narrative for samples B0WBR0, B0WBR1, B0WBR2 and B0WBR4 states that the MS/MSD is associated with a different lot number (the other samples in the SSD. This is unlikely since the analysis were conducted several days apart (see pages #11 and #13). Are the analysis dates wrong, or other MS/MSD data??

FAX

TECHLAW, INC.

451 Hills, Suite 23
Richland, WA 99352
509-375-5667
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 20 December 1999

Information Request

H0534-Rad

No indication of a matrixspike foc 311 & C-14.

FAX

TECHLAW, INC.

451 Hills, Suite 23
Richland, WA 99352
509-375-5667
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 17 December 1999

Information Request

H0534

The samples are not listed in the VSR.

Duncan, Jeanette M

From: Todd, Mary E
Sent: Wednesday, March 15, 2000 1:18 PM
To: Duncan, Jeanette M
Subject: validation reports

Jeanette,

We do not have any comments on the validation packages. We will support the comments from Rich.

Thanks

Mary & Chris

FAX

TECHLAW, INC.
451 Hills, Suite 23
Richland, WA 99352
509-375-5667
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 20 December 1999

Information Request

H0534 - VOA

The case narrative for samples B0WBR0, B0WBR1, B0WBR2 and B0WBR4 states that the MS/MSD is associated with a different lot number (the other samples in the SSD. This is unlikely since the analysis were conducted several days apart (see pages #11 and #13). Are the analysis dates wrong, or other MS/MSD data??

FAX

TECHLAW, INC.
451 Hills, Suite 23
Richland, WA 99352
509-375-5667
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 20 December 1999

Information Request

H0534 & H0505-PCB ← 502

What values do you want me to use for CRDLs??

~~No indication of a matrixspike for 3H & C-14~~

DL Requirements table attached

KJM 1-18-00

Table A2-2. Analytical Performance Requirements - Deep Zone Soils. (2 Pages)

Data Type	Analytical Method	Analyte	Preliminary Action Level	Detection Limit Requirements		Accuracy Required	Precision Required
				MDL	PQL		
Radionuclides, in pCi/g							
Rad, α	GeLi/HPGe AmAEA[a]	Americium-241	[j]	0.1 0.1	1 1	80-120 70-130	±30 ±30
Rad, γ	GeLi/HPGe	Cesium-137	[j]	0.05	0.1	80-120	±30
Rad, γ	GeLi/HPGe	Cobalt-60	[j]	0.05	0.1	80-120	±30
Rad, γ	GeLi//HPGe	Europium-152	[j]	0.1	0.2	80-120	±30
Rad, γ	GeLi/HPGe	Europium-154	[j]	0.1	0.2	80-120	±30
Rad, γ	GeLi/HPGe	Europium-155	[j]	0.05	0.1	80-120	±30
Rad, α	NpAEA[a]	Neptunium-237	[j]	0.1	1	70-130	±30
Rad	Chem Separation Liq Scintillation	Nickel-63	[j]	5	30	70-130	±30
Rad, α	PuAEA[a]	Plutonium-238	[j]	0.1	1	70-130	±30
Rad, α	PuAEA[a]	Plutonium-239/240	[j]	0.1	1	70-130	±30
Rad	RADSr	Radiogenic strontium	[j]	0.2	1	70-130	±30
Rad	Chem Separation Liq Scintillation	Technetium-99	[j]	5	15	70-130	±30
Rad	Distillation Liq Separation	Tritium	[j]	5	400	70-130	±30
Rad, α	ThAEA[a]	Thorium-232	[j]	0.1	1	70-130	±30
Rad	KPA	Total uranium	[j]	0.2 mg/kg	1 mg/kg	70-130	±30
Rad, α	UAEA[a]	Uranium-233/234	[j]	0.1	1	70-130	±30
Rad		Uranium-235/236	[j]	0.1	1	70-130	±30
Rad		Uranium-238	[j]	0.1	1	70-130	±30

Inorganic Chemicals, in mg/kg								
Data Type	Analytical Method	Analyte	Preliminary Action Level		Detection Limit Requirements		Accuracy Required	Precision Required
			Meth C[b]	Meth B	MDL	PQL		
Chem	EPA 6010	Arsenic	6.5[c]	6.5[c]	2.5/0.2[d]	10/1[d]	70-130	±30
Chem	EPA 6010	Barium	245[e]	132[c,e]	0.1	1	70-130	±30
Chem	EPA 6010	Beryllium	1.51[c]	1.51[c]	0.03	0.2	70-130	±30
Chem	EPA 6010	Cadmium	0.17[c,j]	0.17[c,j]	0.3/0.02[d]	0.8/0.04[d]	70-130	±30
Chem	EPA 6010	Chromium (III)	36[e]	36[e]	0.4	1	70-130	±30
Chem	EPA 7196	Hexavalent chromium	8.0[f]	17.5[f]	0.1	0.7	70-130	±30
Chem	EPA 6010	Copper	130[e]	59.2[e]	0.5	2	70-130	±30
Chem	EPA 6010	Lead	353[c,g]	353[c,g]	3	20	70-130	± 30
Chem	EPA 7471	Mercury	0.33[c,e]	0.33[c,e]	0.005	0.05	70-130	±30
Chem	EPA 6010	Nickel	70[e]	32[e]	1	4	70-130	±30
Chem	EPA 6010	Selenium	5[e]	5[e]	5	20	70-130	±30
Chem	EPA 6010	Silver	10[e]	8[e]	0.7	2	70-130	±30
Chem	EPA 6010	Vanadium	24.5[e]	11.2[e]	0.5	3	70-130	±30
Chem	EPA 6010	Zinc	500[e]	480[e]	0.5	2	70-130	±30
Chem	EPA 305.1	Ammonia	59,500[h]	27,200[h]	0.2	0.5	70-130	±30
Chem	EPA 9010	Cyanide	2.6[f]	2.6[f]	0.25	1	70-130	±30
Chem	EPA 300.0	Fluoride	200	96	0.2	1	70-130	±30
Chem	IC 300 modified and 353.1[f]	Nitrate	4,400	4,400	0.02	0.2	70-130	±30
Chem	IC 300 modified and 353.1[f]	Nitrite	330	330	0.2	1	70-130	±30
Chem	EPA 300.0	Sulfate	25,000	25,000	2	10	70-130	±30
Chem	EPA 300.0	Phosphate	N/A[e]	N/A[e]	0.6	6	70-130	±30
Chem	EPA 300.0	Chloride	25,000	25,000	0.2	2	70-130	±30
Chem	EPA 9030	Sulfide	N/A	N/A	4	20	70-130	±30
Chem	EPA 9045	pH	N/A	N/A	N/A	N/A	70-130	±30

Table A2-2. Analytical Performance Requirements - Deep Zone Soils. (2 Pages)

Data Type	Analytical Method	Analyte	Preliminary Action Level		Detection Limit Requirements		Accuracy Required	Precision Required
					MDL	PQL		
Chem	EPA 8260	Acetone	175	80	0.05	0.01	70-130	±30
Organic Chemicals, in mg/kg								
Data Type	Analytical Method	Analyte	Preliminary Action Level		Detection Limit Requirements		Accuracy Required	Precision Required
			Meth C[b]	Meth B	MDL	PQL		
Chem	EPA 8260	1-Butanol (butyl alcohol)	350	160	0.4	1	70-130	±30
Chem	EPA 8260	2-butanone (MEK)	105	48	0.005	0.01	70-130	±30
Chem	EPA 8260 as TIC	Butylated hydroxy toluene	N/A	N/A	N/A	N/A	N/A	N/A
Chem	EPA 8260	Carbon tetrachloride	0.337	0.0337	0.001	0.005	70-130	±30
Chem	EPA 8260	Chloroform (trichloromethane)	7.17	0.717	0.001	0.005	70-130	±30
Chem	EPA 8260 as TIC	Decane	N/A	N/A	N/A	N/A	N/A	N/A
Chem	EPA 8260	Dichloromethane (methylene chloride)	0.5	0.5	0.002	0.005	70-130	±30
Chem	EPA 8260 as TIC	Ethanol	N/A	N/A	N/A	N/A	70-130	±30
Chem	EPA 8260	Halogenated hydrocarbons	N/A	N/A	0.002	0.005	70-130	±30
Chem	EPA 8260 as TIC	Propanol (isopropyl alcohol)	N/A	N/A	N/A	N/A	N/A	N/A
Chem	EPA 8260	Toluene	100	100	0.001	0.005	70-130	±30
Chem	EPA 8270	Tributyl phosphate	N/A	N/A	0.4	4	70-130	±30
Chem	EPA 8260	1,1,1-trichloroethane	20	20	0.001	0.005	70-130	±30
Chem	EPA 8260	1,1,2-trichloroethane	0.3	0.0768	0.001	0.005	70-130	±30
Chem	EPA 8080/8082	Polychlorinated biphenyls (PCBs)	66[e]	0.5[g]	0.01	0.1	70-130	±30
Chem	NWTPH-Dx modified for kerosene range	Kerosene, normal paraffin hydrocarbon, paraffin, hydrocarbons, shell E-2342 (napthalene and paraffin), soltrol-170 ($C_{10}H_{22}$ to $C_{16}H_{34}$), purified kerosene, diesel fuel	N/A	N/A	0.5	5	70-130	±30

NOTE: Detection limits in this table are based on optimal conditions. Interferences and different matrices may significantly degrade the values shown.

Dangerous waste generation is not expected at this OU (a contained-in determination is expected for listed waste hydrazine). If generated, the concentrations of any underlying hazardous constituents will be evaluated against applicable regulatory requirements.

α = alpha analysis

γ = gamma analysis

N/A = not applicable

[a] AmAEA, PuAEA, UAEA, NpAEA, ThAEA - chemical separation, electro/microprecipitation deposition, alpha energy analysis via Si barrier detector.

[b] Method C values are based on MTCA industrial standards.

[c] Based on Hanford Site background values.

[d] First value shown is via routine ICP, second value via "trace" ICP or graphite furnace atomic absorption.

[e] The RESRAD model for the 100 Area remedial design/remedial action or 100-N Area corrective measures study predicts that this constituent will not reach groundwater in 1000 years. It is anticipated that the same will be true in the 200 Areas.

[f] Based on Federal ambient water quality criteria and assumed dilution-attenuation factor of 2.

[g] The lead value is based on the IEUBK model from EPA (EPA 1994c).

[h] Ammonia dissolves in the environment and is assumed to not reach groundwater.

[i] Method is from EPA (1984).

[j] There are no preliminary action levels for radionuclides at this time. They will be developed in the remedial investigation/feasibility study

GeLi = lithium-drifted germanium detector

HPGe = high-purity germanium

KPA = kinetic phosphorescence analysis

FAX

TECHLAW, INC.
451 Hills, Suite 23
Richland, WA 99352
509-375-5667
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 20 December 1999

Information Request

H0534 - VOA

The case narrative for samples B0WBR0, B0WBR1, B0WBR2 and B0WBR4 states that the MS/MSD is associated with a different lot number (the other samples in the SSD. This is unlikely since the analysis were conducted several days apart (see pages #11 and #13). Are the analysis dates wrong, or other MS/MSD data??

Bruce,
The lab did indeed run the MS/MSD on the second batch of the 505 5 days after these samples were run. No MS/MSD was ran with this batch. Attached is a revised Narrative which clarifies this a little. Provide with validation as best you can
RLOV 1-18-00

RECRA ENVIRONMENTAL INC.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia
Analytical Report

Client: TNU-HANFORD B99-078
RFW #: 9909L129
SDG/SAF #: H0534/B99-078

W.O. #: 10985-001-001-9999-00
Date Received: 09-17-99

GC/MS VOLATILE

Four (4) soil samples were collected on 09-14-99.

The samples and their associated QC samples were analyzed according to criteria set forth in Recra OPs based on SW 846 Method 8260A for TCL Volatile target compounds on 09-23-99.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. The cooler temperature upon receipt has been recorded on the chain-of-custody.

2. The required holding time for analysis was met.

3. Non-target compounds were not detected in the samples.

4. All surrogate recoveries were within EPA QC limits.

5. Matrix spike analyses for SDG H0534 were performed on RFW# 9909L127, sample ID-B0WBR7.

6. The method blank contained the common laboratory contaminant Methylene Chloride and the target compound 2-Butanone at levels less than the CRQL.

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

01-18-00
Date

som\group\data\voa\tnu09129.doc

01

TRANSMISSION RESULT REPORT (JAN 18 '00 03:52PM)

BHI S&D MANAGEMENT 509 372 9487

(AUTO)

THE FOLLOWING FILE(S) ERASED

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022	MEMORY TX		3755151	03/03	OK

ERRORS

1) HANG UP OR LINE FAIL 2) BUSY 3) NO ANSWER 4) NO FACSIMILE CONNECTION

BHI Sample Management
Phone: (509) 372-9346
FAX: (509) 372-9487

[redacted]

To: Bruce Christian Fax: 375-5151

From: Rich Wurst Date: 1-18-00

Re: 420 634 Pages: 5

CC:

☐ Quick Turn / Priority Data ☐ Final Data Package

Attached

BHI Sample Management
Phone: (509) 372-9346
FAX: (509) 372-9487

facsimile transmittal

To: Bruce Christjon Fax: 375-5151

From: Rich West Date: 1-18-00

Re: HO 634 Pages: 5

CC:

☐ Quick Turn / Priority Data ☐ Final Data Package

Attached

Bechtel Hanford, Inc.
3350 George Washington Way
Richland, WA 99352

Attn: BHI Sample Management
3190 George Washington Way
MSIN: H9-03
Phone: 375-9439
FAX: 372-9487

BHI Sample Management

Fax

To: Bruce Christian **From:** Jeanette Duncan

Fax: 375-5151 **Pages:** 3

Phone: **Date:** 1/10/00

Re: **CC:**

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

• **Comments:**